TECHNOLOGY DEPT.

Gas Journal

VOL. 276. 105TH YEAR. LONDON, DECEMBER 2, 1953. NO. 4722. PRICE 1/3

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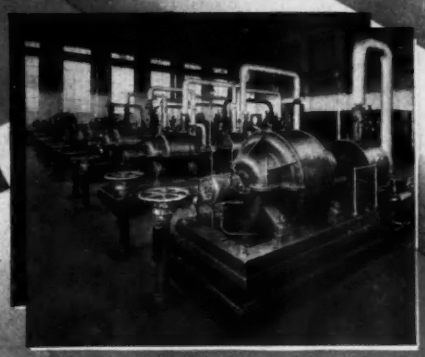

Fig. 828. Rateau Turbo Gas Exhausters

Fig. 777. Double-faced Valves

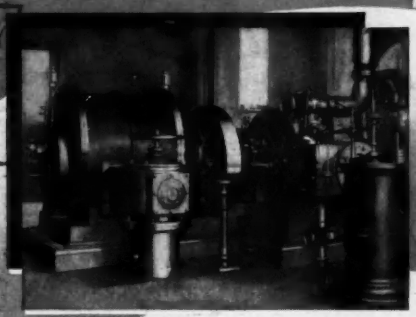

Fig. 705. Gas Exhauster with Steam Engine

Fig. 676. Reynolds District Governor

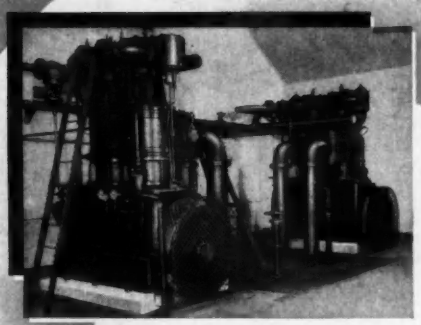

Fig. 947. Reciprocating Compressors

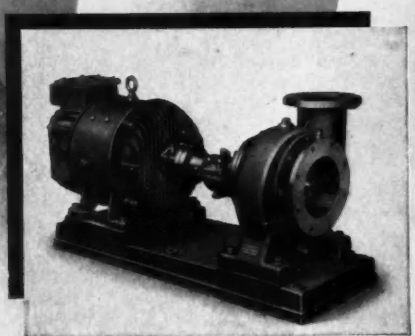

Fig. 900. Centrifugal Pump

Fig. 882A. Service Regulator

Fig. 587A. L.P. Service Regulator

Fig. 623. H.P. Service Regulator

Fig. 587. Safety Cut-off Valves

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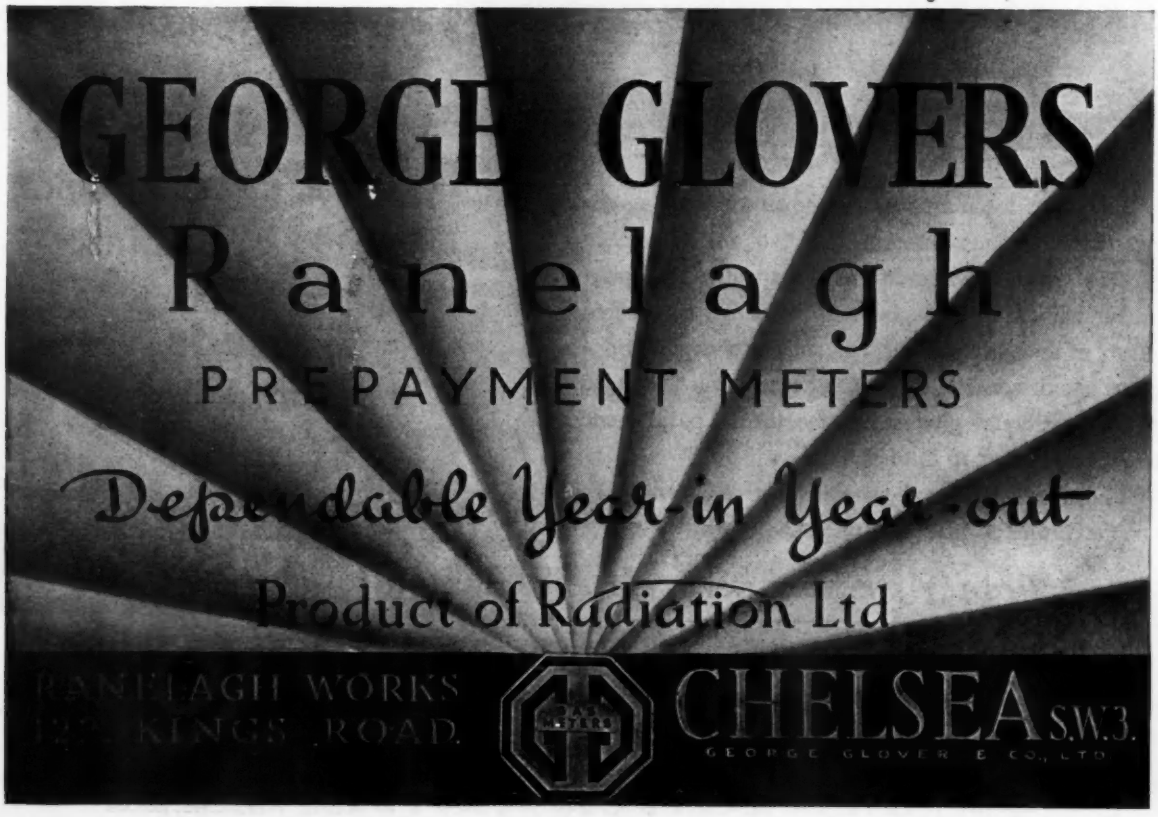

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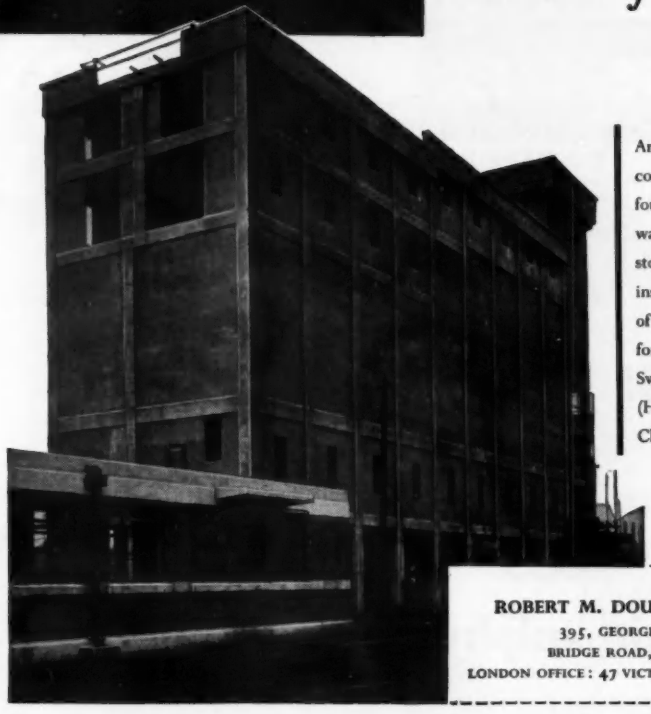

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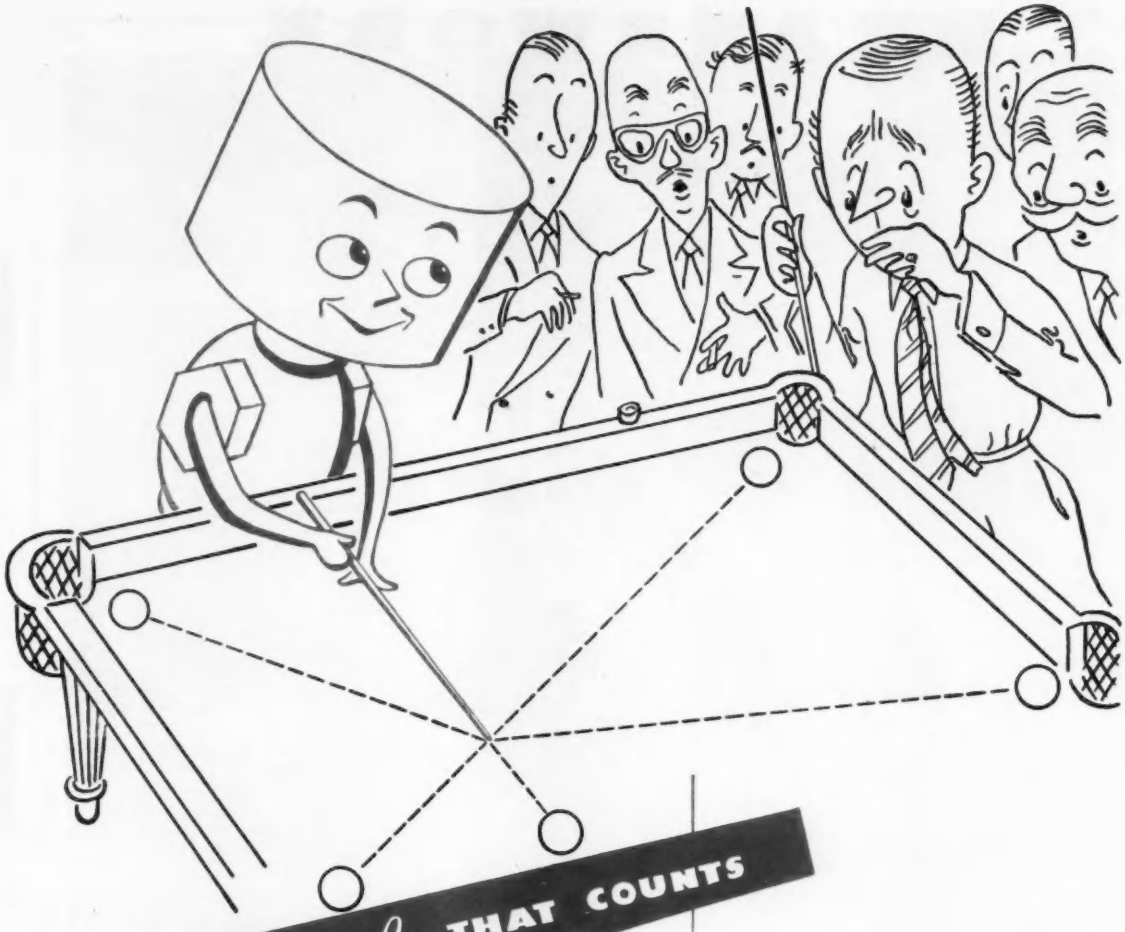

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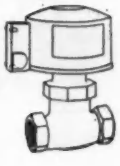

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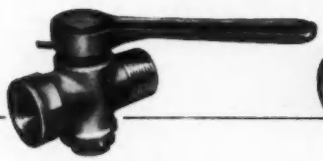

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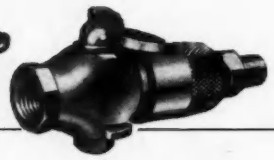

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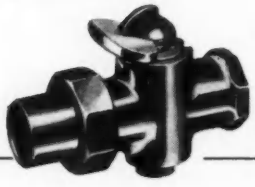

Union Cock with drop lever.

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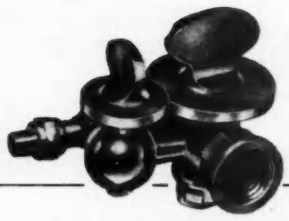

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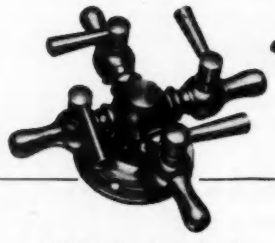

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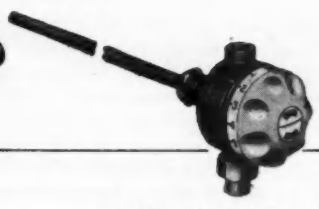

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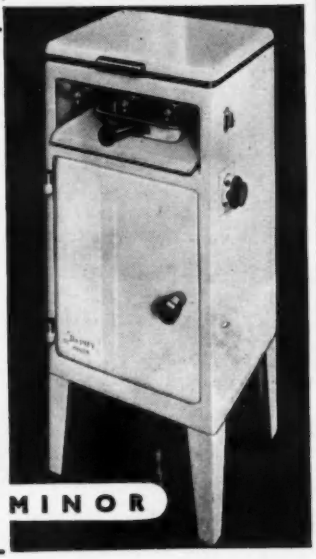

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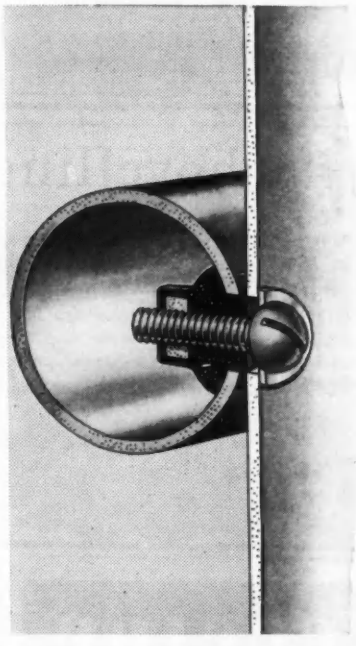

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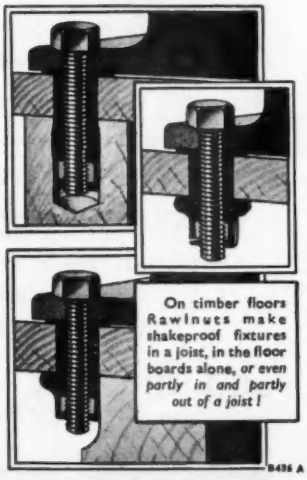
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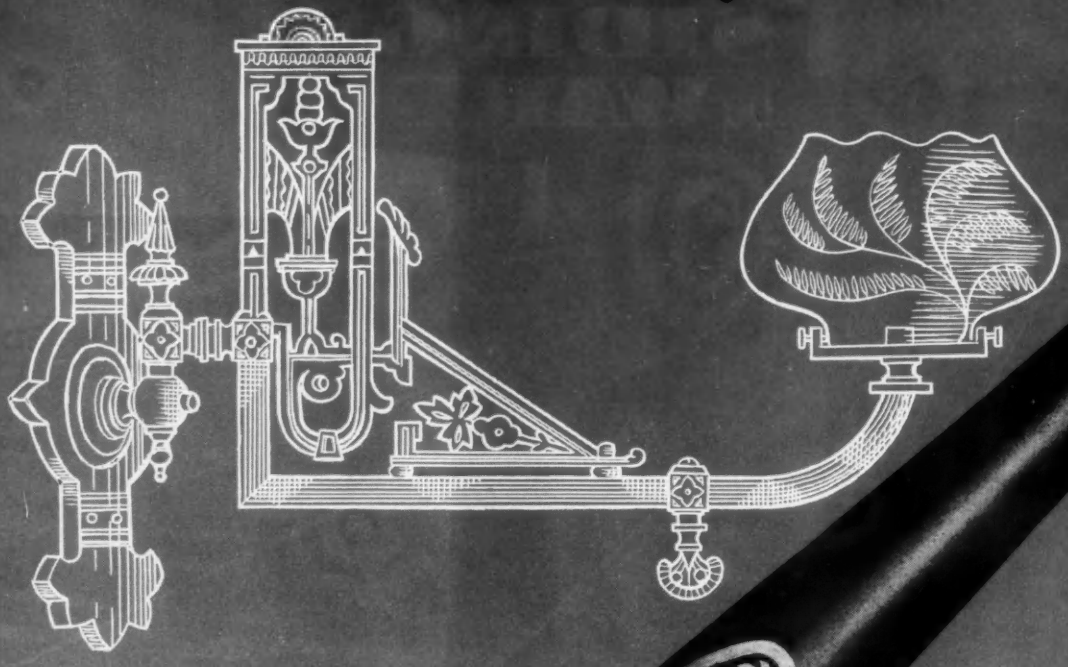

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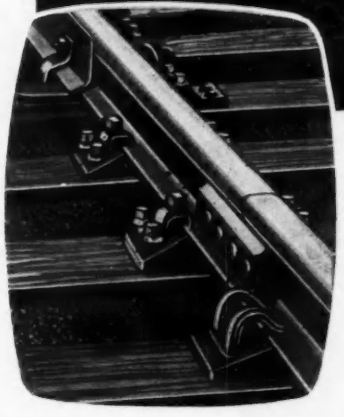

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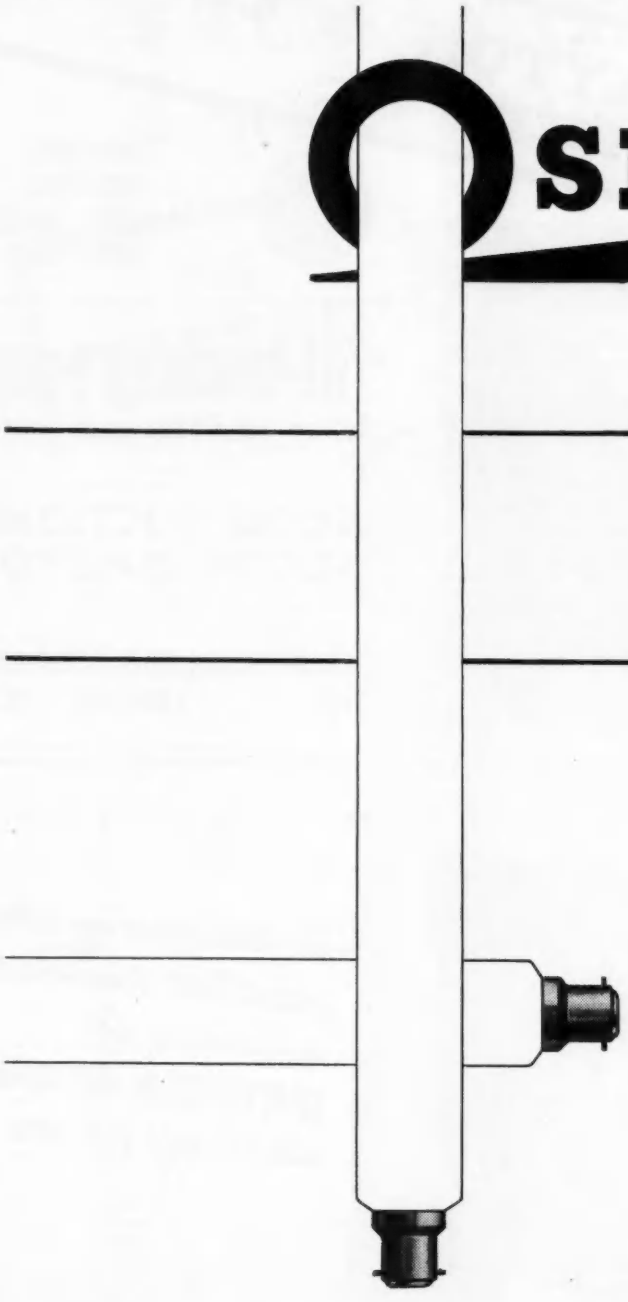

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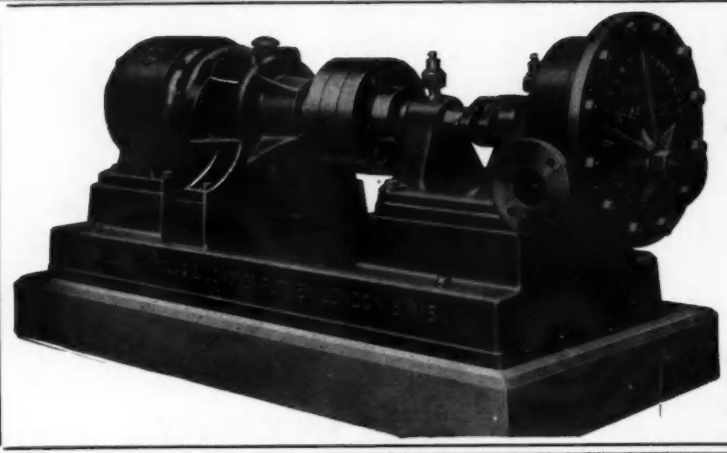

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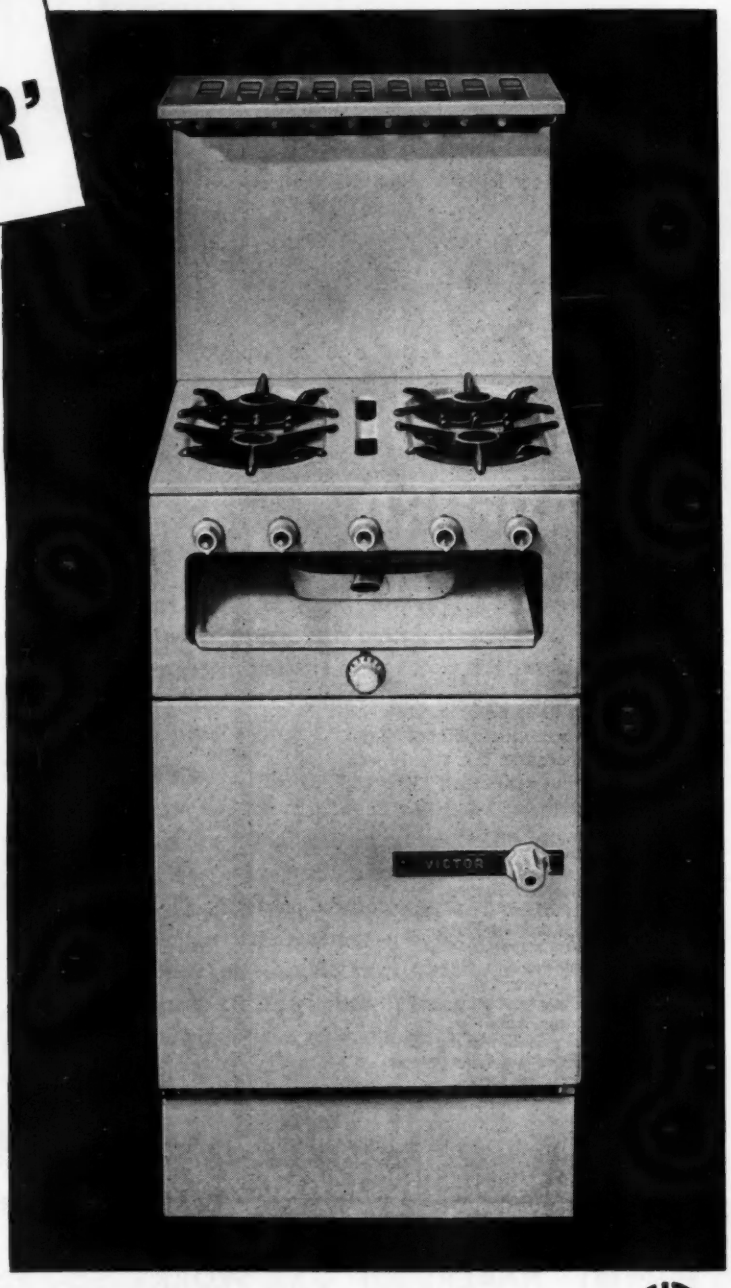

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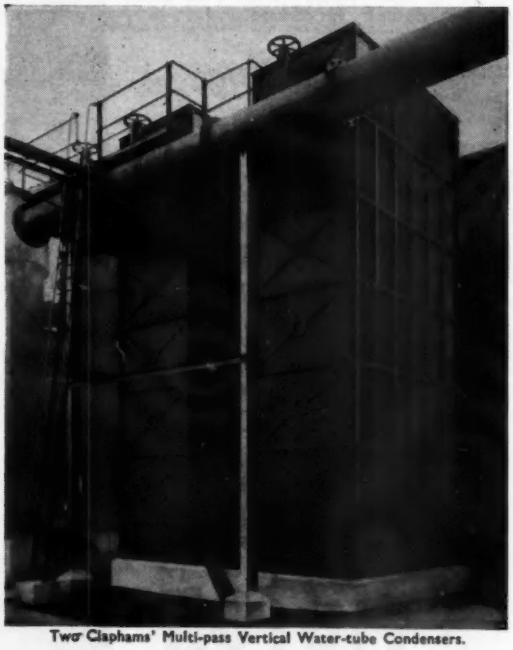
Manufactured by **GENERAL GAS APPLIANCES LTD., AUDENSHAW, MANCHESTER,** *and* **THE FORTH & CLYDE & SUNNYSIDE IRON COS. LTD., FALKIRK, STIRLINGSHIRE**

(Proprietors: Allied Ironfounders Ltd.) REGD. TRADE MARK

RECENT CLAPHAM INSTALLATIONS AT BRADFORD

Two Clapham-Barwick Pumpless Static Ammonia Washers.

Internal deck level view of the Purifier Installation.
(Eight 45 Feet Square Boxes.)



Two Claphams' Multi-pass Vertical Water-tube Condensers.

For over 100 years we have been serving the Gas Industry and the illustrations show equipment recently installed for the North Eastern Gas Board at Birkshall Works, Bradford.

Manufacturers of

- Condensing Plant
- Tar Extractors
- Washers (Pumpless Patent)
- Oxide Purification Plant
- Boxless Purifiers (Prov. Pat.)
- Liquid Purification Plant
- Mechanical Handling Plant
- Coke and Pan Ash Washers
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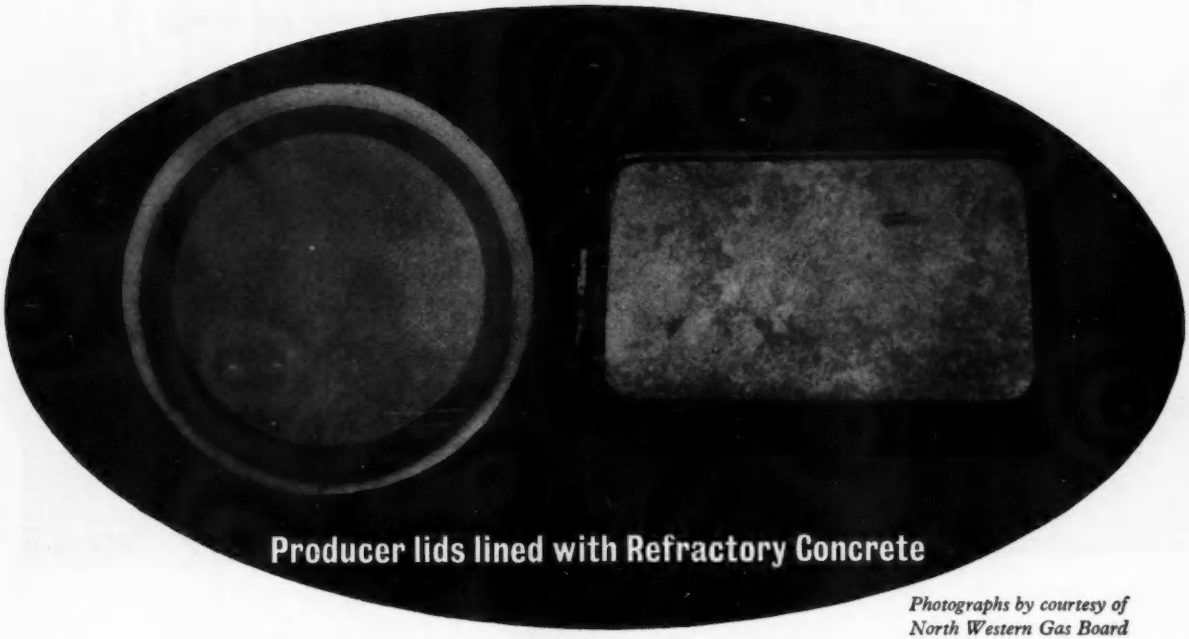
- Gas Pre-Heaters
- Briquetting Plants
- Refractory Brick Making Plant
- Special Pipes and Connections in cast iron and steel

CLAPHAM BROS. LIMITED
MAKERS OF GAS WORKS EQUIPMENT SINCE 1837
KEIGHLEY · YORKS Tel: 2787-2788-Grams: 'Clapham Bros. Keighley'

Gas works engineers have many uses for REFRACTORY CONCRETE

the adaptable refractory material



Producer lids lined with Refractory Concrete

Photographs by courtesy of North Western Gas Board

The wide variety of uses for Refractory Concrete include Retort House Floors, foundations, door linings, Producer linings, charge hole blocks, retort settings, flues, flue pipes, flue linings, quenching floors and cars, coke shoots, top paving, inspection block and plugs, carburetter head tiles, dampers, lids, special shapes, sole patching, charge hole blocks, brickwork mortar and general repairs.

REFRACTORY CONCRETE is Refractory aggregate bonded with Ciment Fondu high-alumina cement: is ready for use and of great strength and hardness in 24 hours: can be used to reduce joints to a minimum: can be cast to any shape: requires no pre-firing: is stable under load up to 1300°C: has a melting point of about 1450°C: has no appreciable drying shrinkage or after-contraction: can be brought to working temperatures 24 hours after making: does not spall under widest sudden fluctuations of temperature: pre-cast blocks or special shapes can be made of practically any size or shape without distortion or cracking: uses old scrap firebrick to a very large extent: provides an ideal bond for setting firebricks.

Concrete Rock-Hard within one day

CIMENT FONDU
Regd. Trade Mark
ALUMINOUS CEMENT

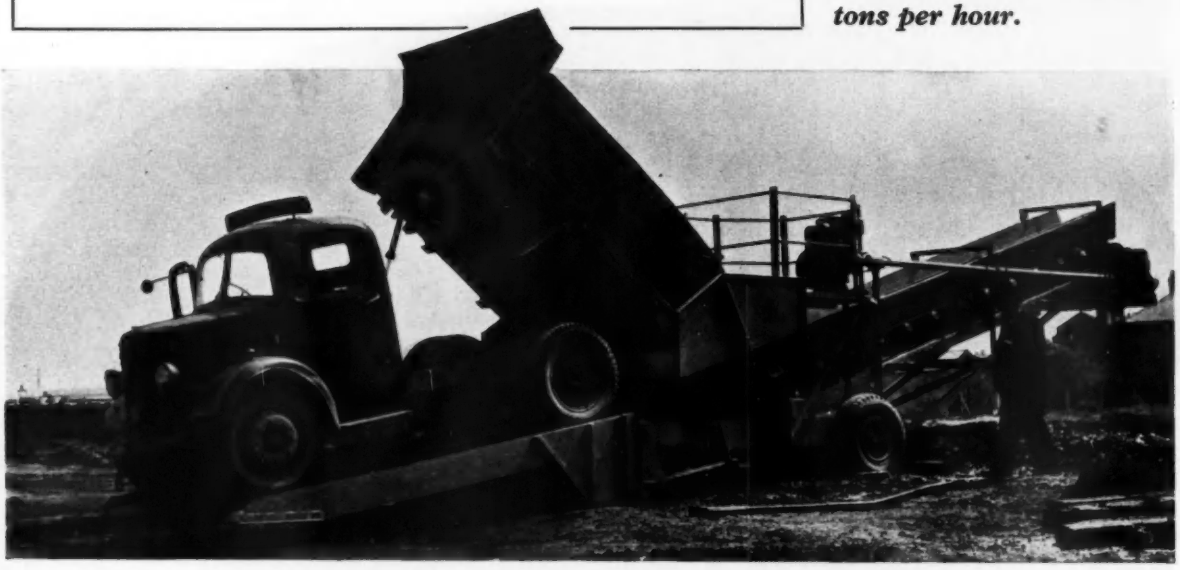
Send for further details including one of our Refractory Charts giving mixes for various purposes.

LAFARGE ALUMINOUS CEMENT CO. LTD.
73 BROOK STREET, LONDON, W.1. Telephone: MAYFAIR 8546

®3/1213

2 MINUTES PER LORRY !

Discharging waste safely over the brink of a 100 ft. deep pit at the rate of 180 tons per hour.



The KANGAROO, Crone & Taylor's latest loader, which comprises as a single unit, ramp, hopper and conveyor, works at a speed that drastically cuts the cost of storing operations.

In 2 minutes it deals with a 6 ton lorry load of waste, in which time the lorry is backed up the ramp, tipped cleanly without spillage, driven off, and its load transferred from the hopper to the pit (or a system of conveyors). 180 tons per hour !

The KANGAROO, which is powered by a diesel engine, is not only quick, it is extremely manageable. Hand-operated hydraulic equipment raises the ramp, and a tow-bar enables the machine to be moved into a new position by any of the lorries that feed its hopper. It is fitted with brakes and can be towed along the highway.

Note the good proportioning and sturdy, rigid construction of the KANGAROO. As the ramp is lowered, the wheels at the feed-end of the conveyor are automatically raised two or three inches above ground level, and are thus freed from all weight and strain during conveying operations.

Full particulars of this revolutionary, fast-operating machine will be sent on request. Please write for leaflet CT. 853

CRONE & TAYLOR LTD.

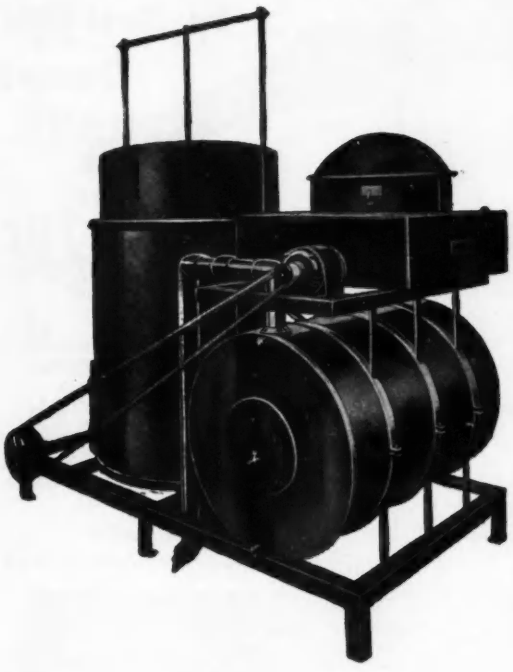
SUTTON OAK, ST. HELENS, LANCS.

Telephone : St. Helens 3397.

If you are faced by any conveying or storing problem, please consult us. Our advice is freely at your disposal.

CT 3772

AEROGEN GAS GENERATORS



PETROL AIR : 300 B.T.U. per cubic foot
PRODUCER AND PETROL COMBINED :
480 B.T.U. per cubic foot

Suitable for Domestic Commercial and Industrial Appliances at Home or Abroad where Town's Gas is not readily available.

Outputs of Plants Range from 100 Cubic Feet to 15,000 Cubic Feet per hour

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ALTON, HAMPSHIRE, ENGLAND

Telegrams: Aerogen, Alton, Hants. *Telephone: Alton* 2081

Steel Bunkers and Chimneys at Power Stations and Works are usually lined with GUNITE which withstands abrasion and chemical attack without adding seriously to the weight.

GUNITE

puts longer life into Bunkers

The Gunite process, developed by the Cementation Co., Ltd., has a successful record of over 25 years as a facing for both new and dilapidated structures.

It is water, weather, and fireproof, and has great mechanical strength and hardness. Its adhesion to concrete is greater than the strength of the concrete itself.

Write for your copy of the Gunite booklet which illustrates and describes its characteristics and applications for factories, chimneys, wharves, water towers, reservoirs, sea walls, silos, etc.

The CEMENTATION COMPANY LIMITED

BENTLEY WORKS, DONCASTER
Tel. 54177-8-9

London office: **39, Victoria Street, S.W.I.**
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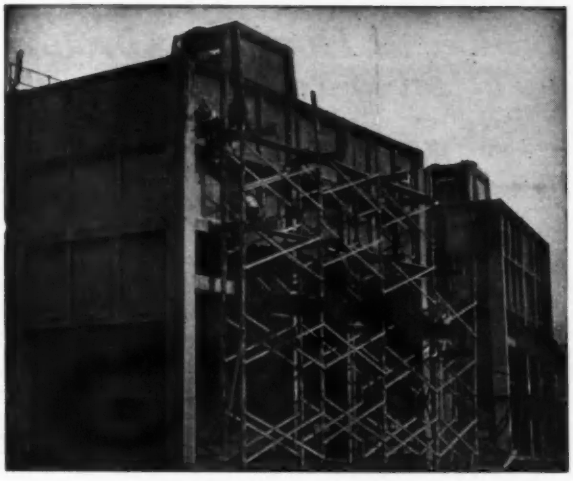
B

Gunite



One of the reinforced concrete structures reconditioned with Gunite for the City of Carlisle Gas Undertaking.

Gunite—concrete applied by air pressure—has numerous applications where its great density and extreme adhesion have exceptional value.

For repairing reinforced concrete it has particular merit, as, due to the method of application, a uniform density and adherence is obtained whenever Gunite is applied.

For lining coal bunkers and steel chimneys it possesses great resistance to corrosion and protects steel-work from the abrasive action of coal or coke.

Handbook "GUNITE" sent on request

THE CONCRETE PROOFING CO., LTD.

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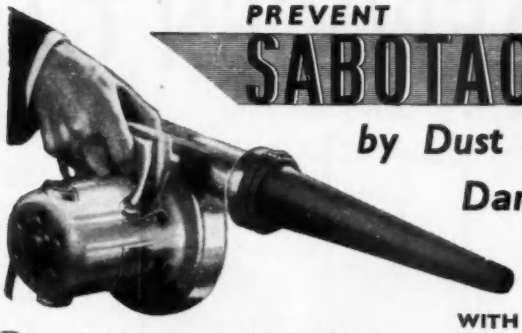
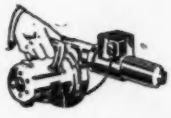
PREVENT SABOTAGE by Dust and Damp!



WITH Secomak

Portable **BLOWING AND SUCTION TOOLS**

Dust and damp can cause serious breakdowns—particularly in equipment which cannot be brushed out. The answer lies in "Secomak" Portable Electric Blowers—the most powerful obtainable and equally useful as suction cleaners. Model 7 weighs only 10 lb. but delivers air at 340 ft. per sec. Model 70 weighs 15 lb. and delivers air at 425 ft. per sec. with static pressure of 33" w.g.



Both models will blow air at temperatures of 200° C. with the "Secomak" Heater Attachment.

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SERVICE ELECTRIC CO. LTD.

SECOMAK WORKS, HONEYPOT LANE, STANMORE, MIDDLESEX

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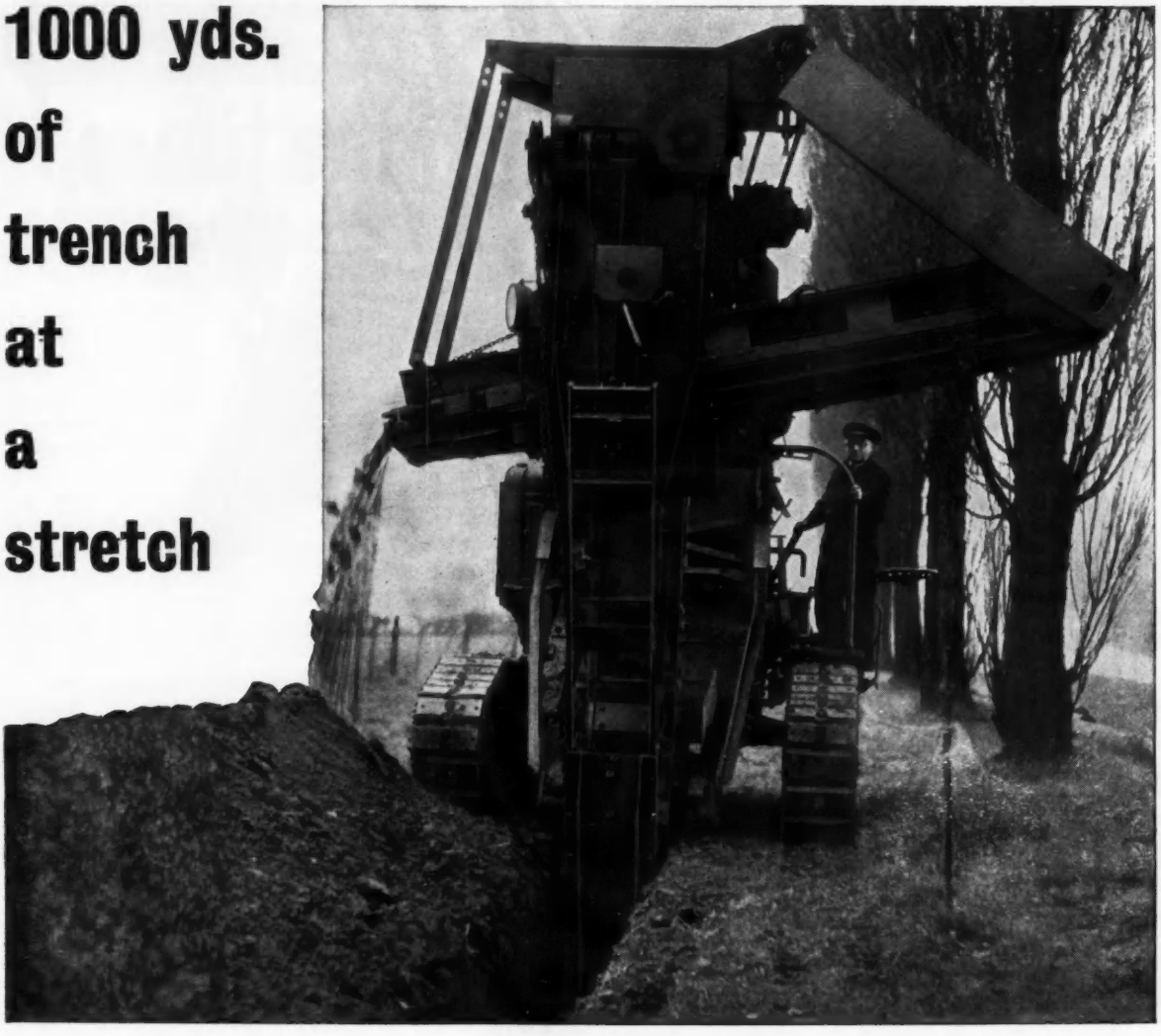
"POP" RIVETS REG'D TRADE MARK

THE MODERN SYSTEM OF RIVETING

1000 yds. of trench at a stretch



The 44c Ditcher shown above is working on the Barnet by-pass, excavating a trench for the Eastern Gas Board. **Fast and Manoeuvrable,** the Ditcher cuts trenches 18", 21" and 24" wide to a maximum depth of 8' 3". **The Vertical Boom** leaves no ramp to be excavated by hand; it also allows the Ditcher to cut round corners, still keeping the boom at the required depth. An exclusive **Automatic Overload Release** protects the machine against underground obstructions and can be set to prevent damage to pipes and cables.

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Barber-Greene Olding VERTICAL BOOM DITCHER

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Industrial Burner

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Radiant Heating Ltd., who have been making flameless combustion appliances for over 30 years, introduce the "Mastertherm" a flameless radiant gas burner, which does not require the aid of air under pressure to bring about surface combustion. This feature naturally opens up a wide field of development. The "Mastertherm" will operate in any position and is capable of a surface temperature of up to 850°C. using towns' gas at 16/10ths water gauge, or liquid petroleum gases.

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Provides a continuous downward flow of healthy radiant heat. Can be tilted from 30° to 75°. Available in two sizes for wall or suspension fitting, it has a consumption of 10,000 or 20,000 B.T.U's per hour at 16/10th Water Gauge Pressure.

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20 to 25 tons of coke de-breezed and bagged per hour

with the SMITH HARMER coke loader

This modern coke loading machine was invented by the head of the Materials Handling Dept. of the Gas, Light and Coke Company and developed in collaboration with Smiths of Rodley. The bucket scoops up about 7 cwt. of coke at a time, separating the breeze and delivering cleaned coke into 1 cwt. bags. The whole operation from the ground pile to the bags is performed as quickly and cheaply as the delivery only from a modern coke hopper. The machine illustrated is capable of handling 20-25 tons of coke per hour. It is available with either pneumatic tyres or crawler tracks as desired. Larger machines are available mounted on crawler tracks and are capable of handling 40-45 tons per hour.

Illustrated leaflet available on request.

Smiths OF RODLEY

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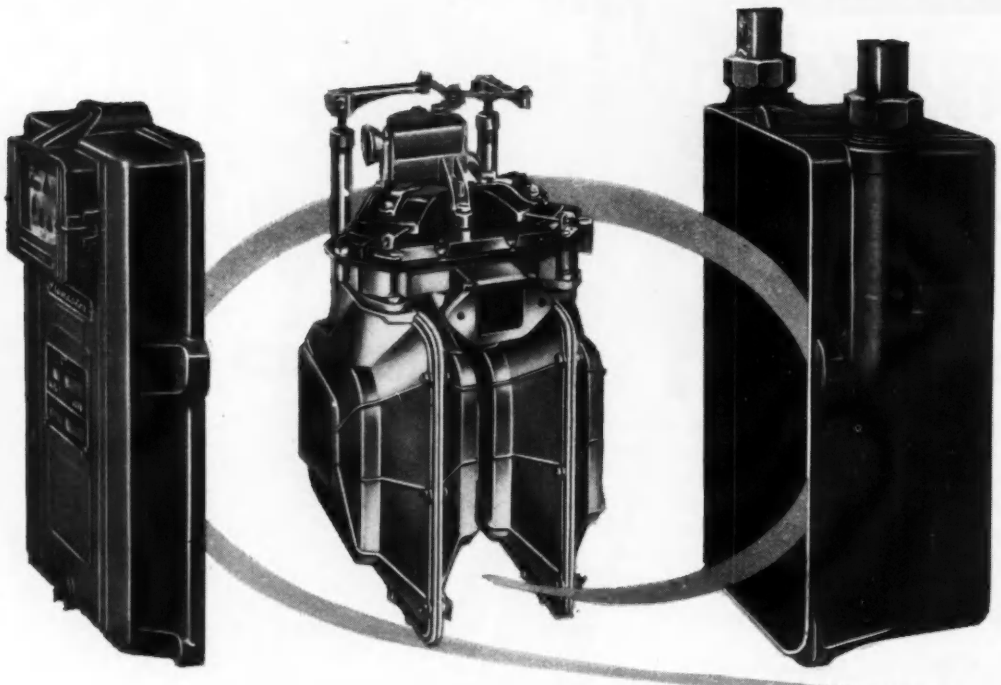
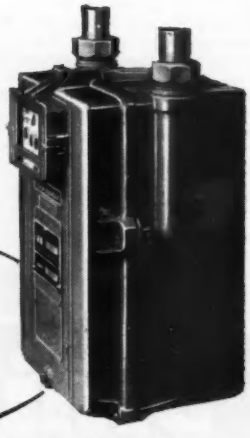
BM32



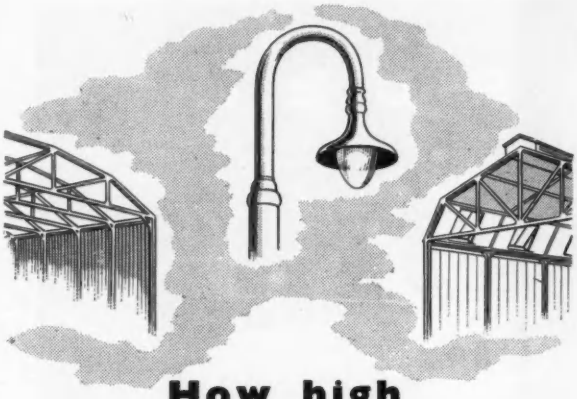
Finer frame for a great-hearted meter

Begwaco have found it possible to make their outstanding meters even better. By housing the measuring unit in a case of only two parts, the meter is made even simpler to service, whilst of course retaining the characteristic Begwaco high accuracy at all rates of flow. This is the result of applying the latest techniques in pressure die-casting. With the new Flomaster, only five screws need be undone to open the case for inspection. And by taking out two more, the entire mechanism can be withdrawn. The Flomaster follows its predecessor in being the meter for everyone's money.

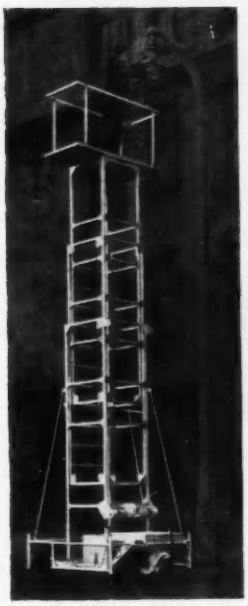


BEGWACO
Flomaster

BEGWACO METERS LIMITED · QUEEN STREET · FARNWORTH · LANCS



How high are your STANDARDS?



STANDARDS of efficiency—of maintenance—of cleanliness—yes, we mean them all. Things out of reach are too often out of mind, until trouble starts. Yet it is only a matter of bringing the awkward fittings within reach in order to give them the attention they require. Gibson Tower ladders do just that, and have found favour with municipalities, Government departments, and firms throughout the country as the most effective way of stepping up to trouble.

All Gibson Towers are made in aluminium alloy—light and strong. Hand winch operation speedily moves the telescopic frames, while pre-tested ropes and mechanical devices fully protect the operator. Electrically propelled, or hand-and-trailer models are available, and all towers have stabilising jacks, parking brakes, and all those etceteras which mark a well finished job.

Gibson Towers are idea for all high-level maintenance work, outdoors or indoors. Users report that they recover the cost within eighteen months by reduced labour costs.

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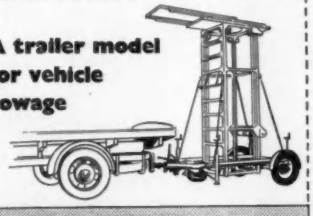
... and it folds up too!



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Manufactured by

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Jameson Place, Leith, Edinburgh 6. *Telephone: 35418 (4 lines)*

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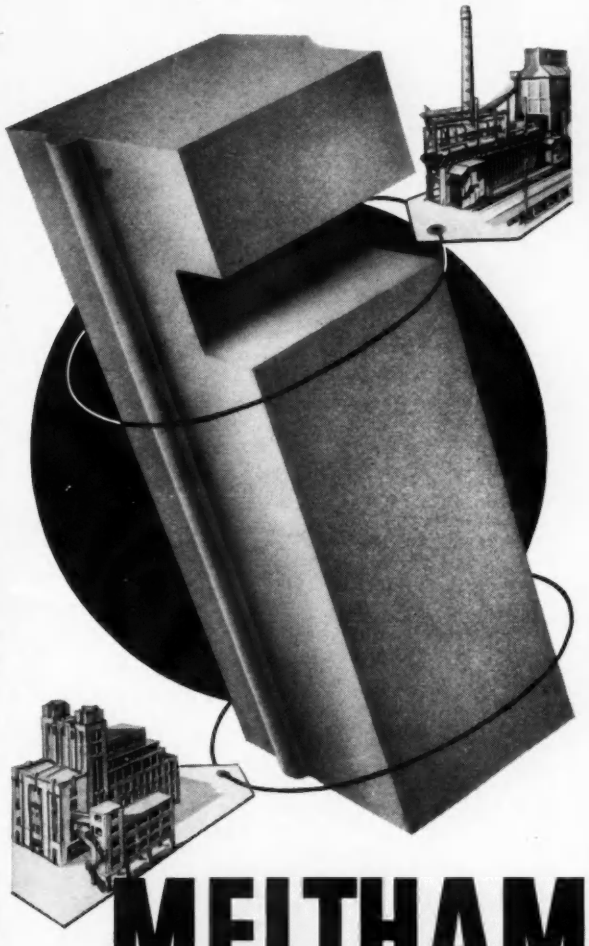

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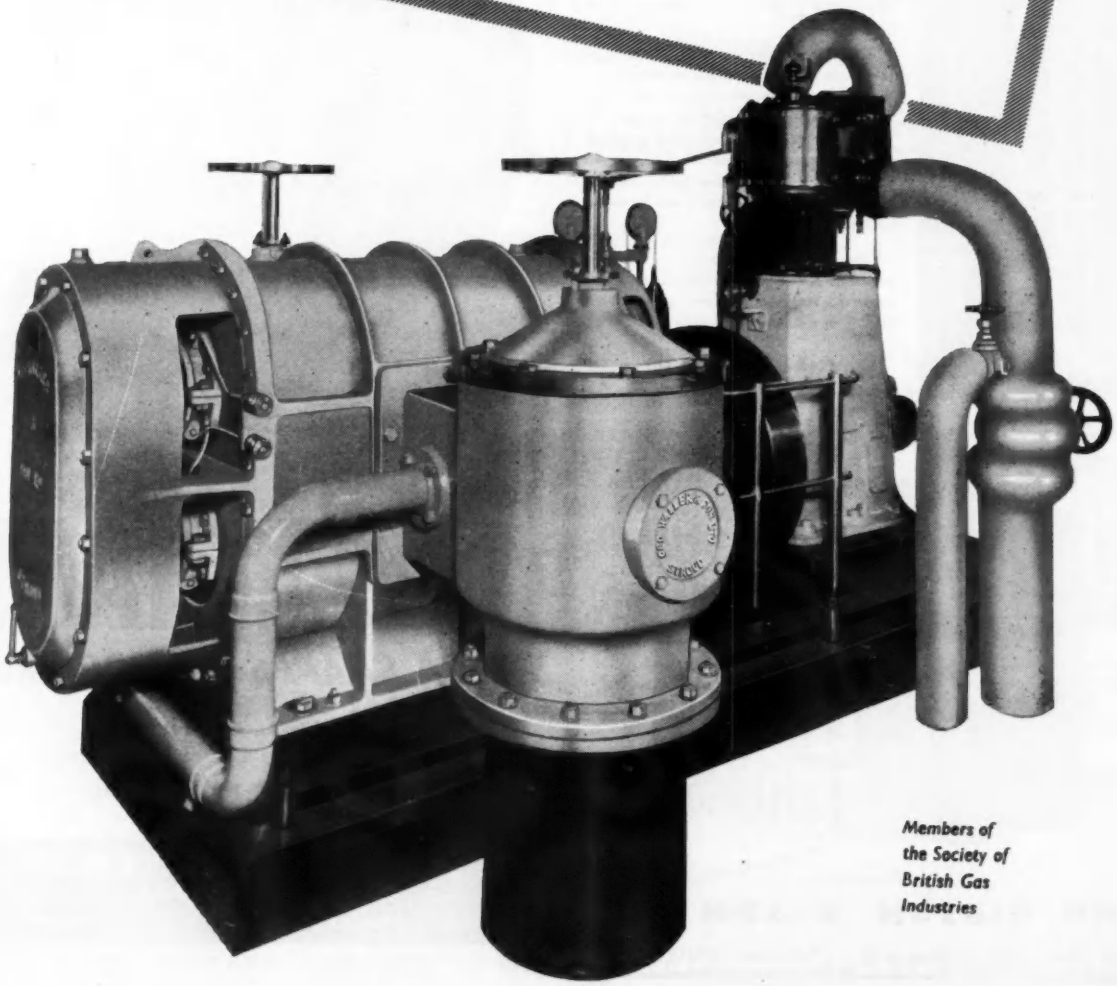

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LOW PRESSURE

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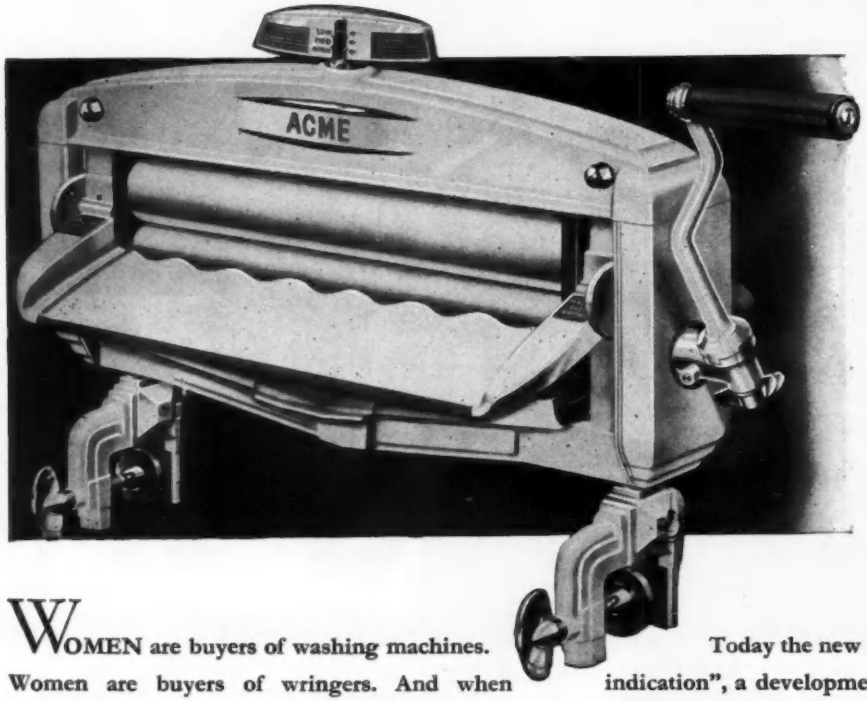

WOMEN are buyers of washing machines. Women are buyers of wringers. And when women think of wringers they think of the Acme. So when your machines are Acme-fitted your customers know that they must be, like the Acme, the best on the market.

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Acme does a better job, lasts longer and gives the best results. That's why Acme's reputation is world wide. That's why more than four million women have chosen an Acme in preference to all others. That's why, when your washing machines are Acme-fitted, women know they're buying the best.

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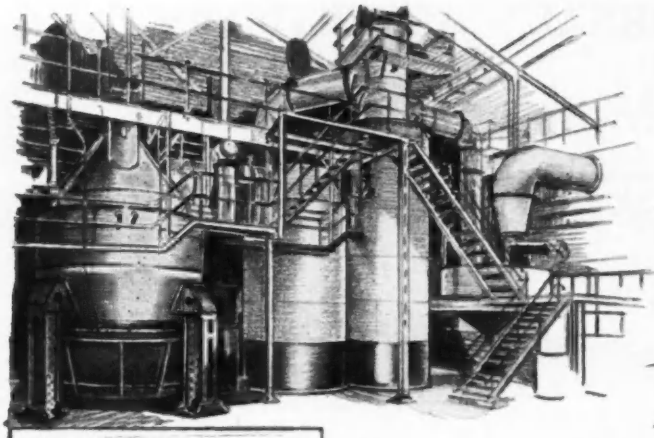

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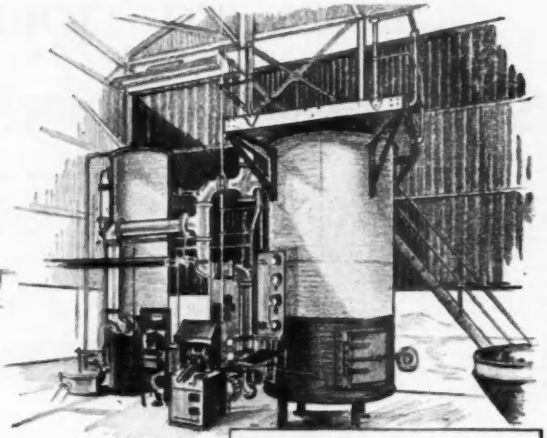

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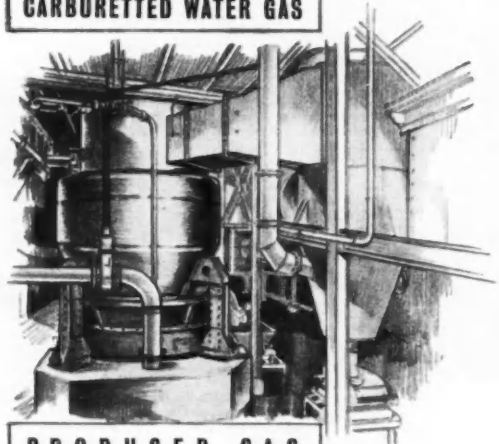

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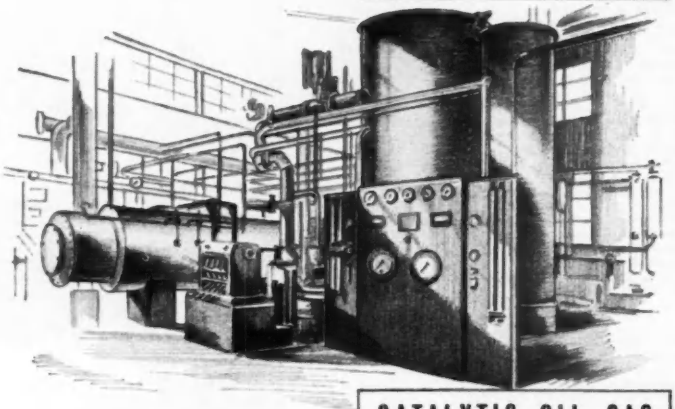

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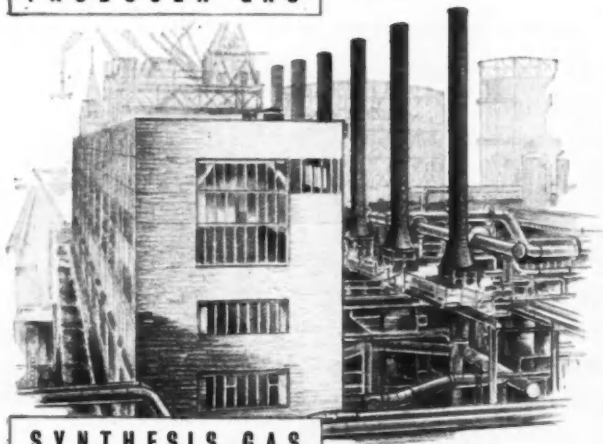

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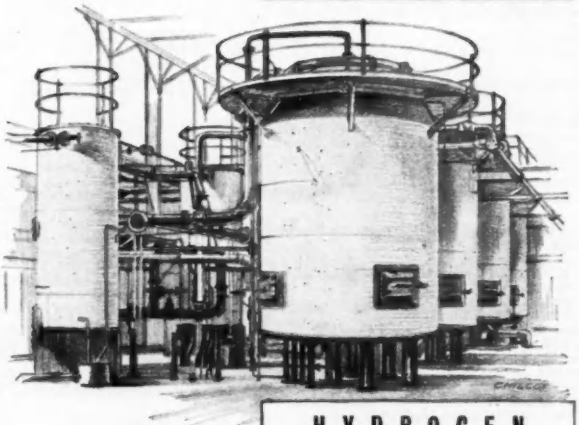

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105th YEAR OF PUBLICATION

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GAS JOURNAL

VOL. 276. No. 4722 105TH YEAR December 2, 1953

THE 19th RESEARCH MEETING

If parents in search of careers for their sons, if adventurous youth in search of a life full of varied interest and problems worthy of an alert intellect, will look over the subjects set out in the programme of the Autumn Meeting of the Institution of Gas Engineers they should surely find something worthy of their steel. They will find that scientists, young and not so young, already engaged in the industry are bringing keen intellects to the solution of a wide variety of problems, enjoying themselves in present achievements with no lack of plenty more to come. And all this conducted in an atmosphere alive with the cut and thrust of intelligent and exhilarating debate which should appeal to any young man worth his salt. If this aspect of the gas industry, therefore, can be presented to the present generation of school and college leavers, we believe there should be no difficulty in securing, what the industry must have, a steady recruitment of young technologists and technicians to carry on its work and maintain its place in the economy of the nation.

At first sight the Report of the Education Committee gives no such cause for optimism. But Mr. J. H. Dyde was surely justified in bidding us see in the present results just the end of the old scheme with students of poor qualifications and insufficient background education straining to get through before the standard is finally raised, as well as in bidding us face that raising of the standard with courage. And we were encouraged by the presentation of the first certificate of the new system to Mr. Collieson, of Wallasey. With our wishes for his future success he carries with him the banner of hope into a new stage of the development of gas industry personnel. Not that the industry ever lacked a certain number of men of the highest quality to blazon the track in front of it. We hail a bright example in the person of Mr. E. G. Stewart, whose retirement from active life in the front line was suitably marked by the leaders of the industry and generously acknowledged by the warm and sincere applause of those who attended the meeting, applause which will reverberate throughout the whole body of his colleagues. What we must have is an increasing number of men of his calibre with the scientific background of their day to take his place and those like it in the ranks of the industry.

If we seek for an epitome of the current activities of the industry's organisation in the Chairmen's Technical Committee, generally turned to internal affairs, we shall find a wide variety of topics, ranging from the disposal of effluents to safety of operatives. We shall discuss all these in some detail later. Just now we may be permitted to comment on the absence of information about the campaign begun so gallantly at Stiviechall in the appraisal of the part played by specific fractions of the effluent. And we welcome the appearance of safety recommendations for the increasing use of electrical equipment in gasworks.

But it is rather on the selection of contributions for presentation at the meeting itself that we congratulate the President, Mr. J. T. Haynes, who, by the way, revealed qualities of ability and urbanity seldom excelled by previous occupants of the Chair. Seldom has a meeting run with such smoothness and such accurate adhesion to the time-table, adjusted once or twice by happy appreciation of opportunity to give everyone plenty of time to express himself without encroaching on that of others.

It was of course a stroke of genius to secure as the opening speaker Sir Charles Ellis, the distinguished scientific leader of the national coal industry, to give us a new view on the oldest and most fundamental of our problems, the elucidation of the mysteries which still persist in the phenomena involved in the heat-treatment of coal. It was a lead which brought into the discussion a number of other specialists from outside our own industry. It may be that we heard old stories told in a new way, so new as to lead us, or at least to encourage us in our efforts, to seek new methods in the treatment of gas coals, with which we are most familiar, as well as to draw into the orbit of our methods some of those coals of lower swelling index with which we shall shortly be called upon to deal. Sir Charles and his collaborators presented a new picture of the coal structure and its development as temperature rises which may yet profoundly affect our approach to this problem—for, as Mr. Dyde reminded us, the adoption of total gasification techniques is not likely to remove carbonisation from its premier position in the gasworks treatment of coal. And, as if to warn us against complacency even on this point, we were then given a glimpse of what the young men, represented by Mr. B. H. Thompson, the Institution Gas Research Fellow, and his tutor at Leeds, Dr. J. E. Garside, are attempting to do in reaching out to the application of

fluidisation in carbonising and gasification technique. Another aspect of our industry from the outside was revealed by the paper on the composition of coal tars by the Director of Coal Tar Research and his Chief Analyst. This appeared to us to be a very blurred picture indeed. No doubt such things are inevitable when looking ahead. The paper was a report of facts. Its authors admit that their hopes that a study of the facts ascertained and tabulated by them 'would reveal certain relationships' were not realised. Frankly we do not see why they should if it is admitted that different coals carbonised in different ways will yield different tars. At first sight it would seem that no pattern is likely to be revealed unless you study tars produced from a limited number of typical coals carbonised under controlled conditions. Mixtures of coals carbonised in 'mixtures' of two or more sets of retorts operating under just what conditions happen to prevail at the time are a long way from this.

GAS COUNCIL RESEARCH

The story of research proper opened with Dr. R. H. Griffith's description of what is now called the London Research Station of the Gas Council—an amalgamation of Fulham and Watson House—the splendid legacy of the pioneering work of the Gas Light and Coke Company. The paper itself is little more than a catalogue of work in hand or projected, much of which has already been referred to in papers of more or less detail. Some of this work has already excited high hopes not only in the researchers themselves, but in us who await their results. High on the list of these is the work on purification—the removal of sulphuretted hydrogen and, we trust, the recovery of pure sulphur. A point which caught our attention was that of effluent treatment. The destruction of phenol and ammonium thiocyanate by methods not dependent on sewage disposal plant would seem to be a significant forward step. From Watson House, the supply engineer and the salesman expect a lot. Water heating 'at lower capital, installation, and running costs, by gas alone or in combination with solid-fuel systems' and with, we hope, a really neat way of getting rid of products of combustion without corrosion and other difficulties, would be the answer to the salesman's prayer.

From Dr. F. J. Dent we learned that a number of British coals have been successfully gasified in the Lurgi generator in Germany with very high thermal efficiencies and satisfactory overall efficiencies, results which can be regarded as solving the technical problem of extending the range of coals available for manufacture, though the process is still not yet adapted to coking coals. The prospects of internal enrichment by the increase of methane production are very good. We also heard of progress in the study of the gasification of powdered fuel by fluidisation and of the erection of another pilot plant for the removal of organic sulphur from gas.

The importance and value of the work reported by Mr. L. A. Ravald on the corrosion and preservation of gasworks plant—largely the technique of painting—cannot be over-estimated. Iron, and particularly iron in the form of mild steel, must remain our main structural material for a very long time. Aluminium is a metal even more plentiful in the constitution of the earth's crust but unfortunately so far its separation as a metal from the compounds containing it has proved too costly to justify its use on a mass scale. Metallic spraying has to some extent supplied the demand for metal resistant to aerial corrosion but even this has not yet displaced to any great extent the need for paint. Even paint has not yet succeeded in endearing to the hearts of the public that 'hallmark' of our industry, the gasholder.

REFRACTORIES

The Joint Refractories Committee has this year given us a more generous selection of its results. The little story of the upward growth of an intermittent vertical retort was not perhaps of great fundamental significance, particularly as growth can and does occur without so simple an explanation as here sufficed. Further progress in investigations of the behaviour of quartz-clay mixtures under heat is more impressive. Just what the implications of these results are in the practice of manufacture and use is not yet clear. Dr. A. L. Roberts warned us that this work was so far the culmination of the first stage only of a complete study. The co-operative test on the thermal conductivity of refractory and insulating bricks is interesting from the laboratory point of view. Experiments on the shrinkage of insulating bricks under reheat and of firebricks under similar conditions appeared to have had for their object to ascertain whether modifications in the standard test requirements are advisable—with no definite conclusion so far.

Progress is also reported in other directions. Two more of the interesting temperature surveys of vertical retorts in operation are being undertaken, investigations are proposed into the significance of grain size in the properties of silica bricks, the trials of bands of different refractories in the flaking zones of continuous verticals are proceeding. Dr. A. E. Haffner announced that the trial of sillimanite was already complete with the result that no improvement from the point of view of flaking was observed. Other materials are to be tried. The achievement of a non-flaking continuous vertical retort remains, as he said, a prize worth striving for. The President voiced the feelings of the meeting when he said that no discussion of this report would be complete without a few words at least from Dr. A. T. Green. And we need not be surprised that these took the form: (1) of a tribute to the strenuous work put in under hot and dirty conditions by Jack Laming in his temperature surveys of retorts; and (2) of a reiteration of his, Dr. Green's, demand for more and more work on the nature of scurf and the scurfing operation as the key to the flaking problem.

The problem of estimating the wind load on the spiral-guided gasholder may now be regarded as finally solved. Mr. F. M. Birks' dictum will be accepted. No further full-scale measurements need be undertaken. Tests on models will serve for all future cases—a very satisfactory conclusion to work which began, as far as we know, with J. O. V. Irminger's work on models placed in a chimney flue, his anticipation of the wind tunnel many years ago. As an aside from this very interesting discussion it is to be noted that this type of holder has won through to general acceptance in this country and that this acceptance is spreading rapidly to the Continent and the rest of the world. Generous tributes are due to the work of Mr. W. A. Simmonds, out in the open and often most strenuous when the weather was at its most unpleasant.

UTILISATION

Mr. E. W. B. Dunning's paper on heat transfer and the cooking process brought a new atmosphere to the autumn meetings. First there was the presence of the ladies. It is a pity that only one of them was persuaded to speak to us. But how well that short speech was delivered—a pleasant change indeed from the laboured reading of the written contribution. Miss M. Godby knows her subject.

The overall impression made by the paper and the discussion was that the cooker is the most highly developed and satisfactory gas appliance of today. It has secured three-quarters of the cooking load of this country; it must have established an even more commanding position in the U.S.A. where large-scale cooking is even more important than it is in this country and where, with the culmination of natural gas, well over 90% of the commercial cooking load is said to be carried by gas. Such distinguished speakers as Mr. A. R. Bennett, of Radiation Ltd., Mr. H. J. Scott, Chief Engineer of Lyons, and Mr. S. J. Cornford, of the British Baking Industry Research Association, lifted the discussion to a high level of practicality.

Mr. Bennett claimed that Regulo had become a standard English word, and his claim will probably be admitted, so important is the part played by the thermostat in modern cooking. It has been objected that the thermal efficiency of the cooker is low. But how do you express flavour and palatability in B.Th.U.? The very first effect of heat on raw food is generally to coat it with an insulating crust. And the final test of efficiency is not the calorimeter but the elusive impression on the palate of the taster. Dielectric cooking might be vastly cheaper in heat expenditure; the result might well be an uneatable product.

Mr. Scott's contribution to the discussion was listened to with an attention and interest heightened in some of us by recollections of our visit to Lyons' factory some years ago. It was curious, however, that he made no mention of the tunnel oven which to some of us was one of the most fascinating pieces of apparatus we then saw. It would seem that the tunnel oven, with its possibilities of thermostatic control and heat economy, is particularly fitted to many of the tasks of mass cooking. Later speakers brought up the problem which is being set by the thick pyrex glass cooking vessel which, as all agreed with Mr. W. E. Benton, of Sydney Flavel & Co., Ltd., has come to stay. The industry is indeed again indebted to Watson House and to Mr. Dunning for a paper of great value—and to Mr. Haynes for its inclusion in the programme.

The neat, effective, and unobtrusive evacuation of the products of combustion is indeed one of the major difficulties encountered by the gas appliance. Messrs. W. H. Bennett and C. H. Purkis dealt with one large-scale aspect of it. Probably each case will have to be dealt with individually. This particular problem may be taken as solved, but there are a multitude of instances where small installations of gas equipment are rendered almost impracticable by the difficulty of getting the gases away.

The 19th Autumn Meeting of the Institution was a memorable one. The President should be highly satisfied with the reception accorded to his selection of papers. If we permit ourselves a remark on the style of some of these papers it is not with any wish to hurt anyone's feelings, but merely with that of easing the task of the reader. Not only would plainer, simpler English, within the limits of accurate expression, make the subject more readily intelligible to the 'lay' reader, but it would make the papers more attractive, more digestible. If our research workers and scientists would avoid the use of jargon in communications to the general run of engineers they would be read and listened to with even more pleasure than during this most enjoyable of autumn meetings.

BEHIND THE SCENES

Gas industry films have come a long way since those first rather amateurish efforts. Today they are at the top of their class in this type of publicity and many of them can unashamedly take their place in any screen entertainment anywhere. At the British Council Theatre on November 26 we had an opportunity to cast an appraising eye over the series of six magazine films which the Gas Council has produced under the title of 'Behind the Scenes.' In each the pattern is the same. That most amiable of compéres, Ronnie Waldman, rings up the curtain of his model theatre, and as the camera glides on stage, we are introduced to what is for most of us a new world. It is a world rather like that conjured up in Alice's looking glass—we see familiar things, from the other side. Behind the scenes we are provided with the answers to a number of questions which have perplexed most of us at one time or another. For example, who has not wondered who makes those fascinating dioramas at the Science Museum and elsewhere? In film No. 4 we meet the gentleman responsible and see something of how it is done. And then who has not pondered over the problem of what happens to all the very lovely pieces of statuary and garden ornamentation that are removed when the stately homes are deprived of the rescuing hand of the N.C.B.? Film No. 5 obligingly provides at any rate part of the answer. In addition we are taken to Dudley Zoo, the Royal Festival Hall, Streatham Ice Rink, and a rehearsal of the Continental Ballet, to name only a few of the exciting journeys which the Gas Council obligingly makes for us. It might be asked what all this has to do with gas. Strangely enough, it has a great deal to do with it. Every sequence has a gas tie-up and in case the point is lost on the audience, Mr. Waldman rather smugly draws attention to it at the end of each film. In short, this is first-class gas propaganda and our thanks are due to the fertile brains which hatched the idea and to Film Workshop, Ltd., which as the name suggests, was responsible for the production.

ENGINEERS' CENTENARY

THE Society of Engineers will celebrate its centenary in 1954. The only professional society in Britain covering all branches of engineering, it was founded in London in 1854 as the Putney Club, for the reunion of engineers who had been educated at Putney College. It became the Society of Engineers in 1857. In 1910 it was amalgamated with the Civil and Mechanical Engineers' Society, which had been formed in 1859, and since then it has been known as the Society of Engineers (Incorporated). It is the third oldest engineering society in Britain. The President-elect for centenary year is Mr. W. R. Howard, an authority on ferro-concrete engineering, who has received three French awards for his work in the international field. He has been a member of the Society since 1917, a Fellow since 1946, and Hon. Treasurer since 1947.

The celebrations will open on May 4 with a conversazione at the Science Museum, South Kensington. On May 5 a business session will be devoted to papers dealing with 100 years' progress of civil, mechanical, electrical, and aeronautical engineering. On May 6 there will be a day trip on the River Thames to visit the Lafarge Aluminous Cement Company's works at West Thurrock, Essex. The climax will be the centenary banquet in the Fishmonger's Hall. Scottish members will hold their own centenary celebrations on May 15 with a banquet at the headquarters of the Royal Society of Edinburgh.

Personal Notes

MR. A. A. SUGG has resigned his directorship of William Sugg and Co., Ltd.

MR. P. P. MACDIARMID has been appointed a Director of United Gas Industries, Ltd. He was appointed a Director of the various subsidiary companies in the group in July.

MR. C. R. TROTTER, resident technical representative in Scotland of Tully, Sons, & Co., Ltd., may now be contacted at 'Ferryburn,' Roseberry Avenue, South Queensferry (T/N. South Queensferry 244).

MR. B. J. BRADFORD, A.M.I.E.E., has been appointed Publicity Manager of the Rheostatic Co., Ltd. Mr. Bradford has been with the company since 1947 and for the last four years was manager of the Glasgow office. He is now stationed at the head office at Slough.

MR. ALONZO LIMB, Deputy Chairman and Managing Director of C. C. Wakefield & Co., Ltd., broke his thigh bone on the eve of leaving hospital after a period of convalescence. Although his enforced rest will be prolonged, he is making good progress at University College Hospital.

MR. FRED GOLDEN, who has completed 40 years' service with the gas industry, was recently presented with an eight-day clock by his fellow employees to mark his retirement. Practically all the staff of the Sidmouth and Ottery St. Mary (Devon) units, comprising the Sidmouth Group of the South Western Gas Board, attended the presentation, which was made by Mr. J. O. Branston, District Officer, at the works at Sidmouth.

MR. F. GROCOTT, Deputy Engineer, Saltley Works, has been appointed by the West Midlands Gas Board to be Deputy Engineer, Nechells Works, Birmingham. Other appointments announced by the West Midlands Board are MR. S. C. CRATHORN (Swan Village) as Deputy Engineer, Saltley Works, Birmingham; MR. D. H. DUIGNAN (Spalding Group, East Midlands Gas Board) as Deputy Engineer and Manager, Hinckley District; and MR. J. BURBRIDGE (Meadow Lane Works, Leeds Group, North Eastern Gas Board) as Deputy Engineer and Manager, Leamington and Warwick District.

Obituary

MR. W. S. MORLAND, whose death has taken place at Hempsted, Glos., at the age of 90, was for many years Engineer of the Gloucester Gas Light Company. He went to Gloucester 87 years ago from Stranraer when his father was appointed Manager and Engineer of the Gloucester Gas Light Company, and was educated at the Crypt School. In 1884 he was appointed Assistant Engineer to his father and in 1899 was appointed Engineer to the Company, a post he held until his retirement in 1935. Mr. Morland served on the National Joint Industrial Council for several years and was a Director of the Cinderford Gas Company. His retirement in 1949 from the Chairmanship of the Cinderford Gas Company ended over 100 years of direct family connection with the gas industry, his father having been appointed Engineer and Manager at Stranraer in 1849. His brother, Mr. T. O. Morland, was successively Engineer, Managing Director, and Chairman of the North Shore Gas Company, New South Wales, from 1895 until his retirement in 1932. His nephew, Mr. W. Morland Fox, is Director of W. J. Jenkins & Co., Ltd.

Correspondence

SURFACE COMBUSTION

DEAR SIR,—The article on page 521 of the issue of the 'GAS JOURNAL' of November 25 is so interesting to me that I cannot refrain from making a few comments. Mr. Minchin refers in the course of his article to the blocking-up of the pores in a sintered block used for surface combustion. I can only assume that he refers to the well-known No. 1 'Surface Combustor' burner which has been manufactured exclusively by my company for over 30 years. This reference shows a lack of up-to-date knowledge, otherwise he would have known that this particular difficulty was overcome by us many years ago. There are many thousands of this type of burner in use today, not only in this country but all over the world, and our sales are now greater than at any time in the history of the firm.

Mr. Minchin confuses the problem of entraining air for combustion at low pressures, by drawing a parallel between this action and that of diffusion of gas and air at atmospheric pressure. No comment of mine is needed to show how erroneous such a comparison is. The problem is one of mixing two gases of differing density in a small space, in a very short time, without stratification. The design of the venturi can materially assist this, whether operating at high or low pressure behind the injector nipple.

His remarks on flash-back do not bear too close an examination because this factor is governed more by the total B.Th.U. liberation per sq. in. of port area than by the pressure behind the injector nipple. In describing the Schwank burner, Mr. Minchin refers to his earlier work in establishing the data necessary to design a flame-proof head in steel, and relates this to the insulating properties of the Schwank burner. That this property, to which he attributes the successful operation of the Schwank burner, is not of paramount importance has been proved by the research work carried out by my company over the last 20 years.

Yours faithfully,
A. DOCKING,
Managing Director.

Radiant Heating, Ltd.,
Radiant Works, N.1.
November 27, 1953.

1953 'Journal' Directory

THE major part of the 1954 edition of the 'GAS JOURNAL CALENDAR AND DIRECTORY' has gone to press, but it will be a few days before subscribers receive their copies. In the meantime there are inevitable changes. In order that readers may continue to keep their copies of the 1953 edition up to date in the remaining period before the new issue makes its appearance the following changes should be noted, together with the appropriate adjustments relating thereto in the 'Personnel' Section, pp. 141-156:

Page 25.—NORTH THAMES G.C.C.: Address changed to Palace Chambers, Bridge Street, Westminster, S.W.1. T/N TRAfalgar 4773.

Page 30.—EAST RETFORD: Delete S. O. Pacey, *Local M.*, retired.

Page 59.—NORTH WESTERN GAS BOARD: Add Dr. C. J. T. Cronshaw, *Part-time Member.*

Page 112.—DENBIGH: Delete C. Wyver, *E. & M.*, retired.

Page 130.—GLASGOW DIVISION: Add A. Bujnowski, *Sales and Service Superintendent.*

Page 184.—WESTERN JUNIORS: S. W. Hayes (Barnstaple), *Hon. Sec.*

Diary

Dec. 4.—LONDON JUNIORS: Annual Reception and Dance, Caxton Hall, St. James's Park.

Dec. 5.—SCOTTISH JUNIORS: Joint meeting of Eastern and Western Districts, 'Coke Preparation and the Gas Engineer,' H. S. Hughes, Scottish Gas Board, at Edinburgh.

Dec. 5.—YORKSHIRE JUNIORS: 'Ourselves and our Jobs,' A. W. Field, Divisional Personnel Officer and Buyer, Sheffield Division, E.M.G.B. At York.

Dec. 7.—WEST MIDLANDS G.C.C.: Dudley Room, Queen's Hotel, Birmingham, 2.15 p.m.

Dec. 7-11.—SMITHFIELD SHOW, Earls Court. Gas Council exhibit.

Dec. 9.—EAST MIDLANDS G.C.C.: Special Meeting, Victoria Station Hotel, Nottingham, 11.30 a.m.

Dec. 9.—NORTHERN JUNIORS: Short Paper Meeting for Arthur Clement Hovey Medal.

Dec. 9.—LONDON JUNIORS: Visit to Hackbridge & Hewittic Electric Co., Walton-on-Thames.

Dec. 9.—MANCHESTER JUNIORS: Visit to A. V. Roe & Co., Ltd., Aircraft Works; 'Industrial Gas,' J. Palmer (Liverpool).

Dec. 10.—EASTERN JUNIORS: Visit to works of Dewrance & Co., Ltd., London.

Dec. 11.—BRITISH GAS STAFF ASSOCIATION: Meeting, Kent Hall, St. Andrews Halls, Glasgow.

Dec. 12.—WALES AND MON. JUNIORS: 'The Mechanical Side of the Gas Industry,' L. Starr, Wales Gas Board Headquarters, Cardiff.

Dec. 15.—MIDLAND JUNIORS: 'Methods for the Determination of the Accuracy of Gas Metering,' A. E. Mason (Birmingham); Staff Mess Room, Council House, Birmingham, 6.30 p.m.

Dec. 17.—WALES JUNIORS (North): Tour of works of John Summers, Ltd., Shotton.

Dec. 18.—LONDON JUNIORS: 'Coke and the Future,' F. S. Evans, Coke Manager, South Eastern Gas Board; 178, Edgware Road, 6.30 p.m.

Dec. 31.—NORTH THAMES G.C.C.: Westminster City Hall, Charing Cross Road, 2.30 p.m.

Dec. 31-Jan. 13.—SCHOOLBOYS' EXHIBITION, Horticultural Hall, Westminster, Gas Council exhibit.

Institution Autumn Research Meeting

Two Full Days of Reports and Papers

The Institution of Gas Engineers held its 19th autumn research meeting at Church House, Westminster, on November 24 and 25 under the Presidency of Mr. J. T. Haynes. It was actually in 1929 that the Institution held its first research meeting, but there was a break between the tenth of the series in 1938 and the eleventh in 1945.

THE attendance was well up to the average, and the agenda covered the presentation and discussion of five reports (three from the Institution and two from the Gas Council) and six papers (two from the Institution and four from the Gas Council). The proceedings started with the reading of a loyal message which had been sent to the Queen (a little longer before the meeting than usual because of the particular circumstances of Her Majesty's departure on her world tour the previous evening), and the reply from Buckingham Palace.

Continental Visitors

The **President** proceeded to extend a cordial welcome to a number of Continental gas engineers who had met the previous day as members of the Council of the International Gas Union. They were: Messrs. M. Brabant (Immediate Past President, International Gas Union); P. Celis (President, Fédération de l'Industrie du Gaz); R. H. Touwaide (General Secretary, International Gas Union and Belgian Gas Association); P. Agron (Gaz de France); A. Baril (Past President, International Gas Union); M. Ferlet (President, Association Technique de l'Industrie du Gaz en France); J. Kec (Immediate Past President, Association Technique de l'Industrie du Gaz en France); A. Lihrmann (General Secretary, Association Technique de l'Industrie du Gaz en France); P. Mougin (Vice-President, International Gas Union); Professor G. Ribaud (Director of Research, Gaz de France); O. Kohl (General Secretary, Arbeitsgemeinschaft des deutschen Gasfachs); Professor G. A. Brender à Brandis (Vice-President, International Gas Union); and H. Raeber (General Secretary, Société Suisse de l'Industrie du Gaz et des Eaux).

New Members

The **Secretary** (Dr. W. T. K. Braunholtz) informed the meeting that the Scrutineers had reported that all the gentlemen whose names appeared on the ballot list had been duly elected. They comprised seven Members, 65 Associate Members, and 24 Associates.

The **President** said that before asking Mr. G. E. Currier to present the 14th Report of the Chairmen's Technical Committee, he would like on behalf of the Council and all the members of the Institution to express thanks to those members of the Institution who had so freely given their services and the benefit of their knowledge to the gas industry by serving on the various Committees. It was a well worth while job. It was of inestimable value, not only to their own industry but also to other industries. He was certain that Colonel Sir Harold Smith, as Chairman of the Gas Council, would like him to say how much the Gas Council appreciated the work put into all the Committees by members of the Institution.

Mr. G. E. Currier, O.B.E., as Chairman, presented the 14th Report of the Chairmen's Technical Committee, and **Mr. J. H. Dyde** followed with the 30th Report of the Gas Education Committee.

Management Training

The **President** said they were proud, as they had every right to be, of the Education Committee. For many years it operated under the Chairmanship of Mr. John Terrace, who built up a tradition for which they had every reason to thank him. Unfortunately, Mr. Terrace had had to miss his first meeting for a long time. He was not seriously ill, but his daughter felt that he was hardly fit to come out on a November day. He was sure the members would wish to send him a message of good wishes and greetings. When Mr. Terrace vacated the Chair, Mr. Dyde took over, and the high tradition which Mr. Terrace built up had been carried on to a remarkable degree under the Chairmanship of Mr. Dyde. They appreciated the concentrated thought and effort which he had put into the work of the Committee. The latest effort was the Management Training Course at Brooklands, which catered for a section of the industry which probably thought that it knew everything, but he was sure that it had come to the conclusion that it was still only on the fringe of what was possible and what ought to be known to make the industry as good as they would like it to be.

Juvenile Lectures

Dr. A. E. Haffner, B.SC., in the course of the discussion on the Education Report, referred to 'what may seem to others to be an unimportant part of the education system—the Christmas Juvenile Lectures.' To those about to enter the industry, the first indication they had that the industry had any interest in education might be through such a lecture. By the nature of things, few adults were permitted to attend, and therefore many adults might be quite unaware of the rewarding work which there was in organising these events. The third Christmas lecture associated with the Institution would be concerned with the movement of gases, and would be delivered by Mr. J. E. Davis.

The sub-committee handling Christmas lectures had from the outset had the ambition of arranging for one in the home town of the President. This year it had become possible. This was due to the readiness of Mr. Frank Brinsley to undertake the work and to the co-operation of the Bournemouth education authorities. He assured the President that successful arrangements were being made. The demand for tickets was so high that the lecture would have to be delivered three times on January 4 and 5. The Scottish Association of Gas Managers was also determined to enlist the help of Mr. Brinsley, and another lecture would be delivered in Inverness, and it was expected that several hundred scholars would attend.

The idea was becoming more and more widespread, and Professor Garside, of Leeds University, would be giving a lecture on the same subject to a young Aberdeen audience. This was being done through the organisation of the Royal Institute of Chemistry. Christmas lectures were only one way of attracting the attention of young people about to choose their career. The lectures were based on scientific entertainment and stimulating experimentations, but there was always the underlying hope that some of the youngsters would in due course make a career in the gas industry.

After the first two reports came the presentation of diplomas and awards. The **President** said that in his view, these awards were not won easily. They had meant a tremendous amount of hard work. This had meant the students closing their ears and their eyes to wireless and television and really getting down to hard work in order to absorb the increasing amount of knowledge which was necessary to cope with present-day gas engineering practice. He could only put it down to one thing, in which he hoped he was fooling neither himself nor anyone else. These students had persisted because they had a real belief in the future of the gas industry. If that was so, he was certain that the industry would go from success to success because of the intensive concentration and effort by the students who were coming forward.

The awards were presented as follows: Diploma in Gas Engineering (Manufacture) for 1953, to: Ian Joseph Hartill (Stretford), 2nd Class. Diploma in Gas Engineering (Supply) for 1953, to: John Frederick Day (Kilgwrrwg), 1st Class. (Mr. Day was unable to be present. He had been awarded the Dempster Travelling Fellowship and was in Holland engaged on gas distribution problems.)

Associate Membership Examination: Albert Fielding Collieson (Wallasey).

James Archibald Maclay Memorial Prizes for 1953, to: Henry John Anthony Davies (Bryncoch), Gas Technology (Manufacture); and Arthur Thomas Goodwin (Bromley), Gas Technology (Supply).

Charles Hunt Memorial Medal for 1953 to: Albert Fielding Collieson (Wallasey); Associate Membership Examination—Gas Engineering (Supply).

Presentation to Mr. E. G. Stewart

The **President** said there was one item which was not on the agenda. Members had heard that Mr. E. G. Stewart, having retired from the profession in an operative capacity, had by virtue of the

rules had to retire from the Chairmanship of the Gasworks Safety Rules Committee. Mr. Stewart had been a member of the Institution since 1919. He was appointed within a few years of his joining the Institution to the Purifiers' Committee, which was later merged with the Gasholder Committee to form the Gasworks Safety Rules Committee. Mr. Stewart had been Chairman of that Committee for nearly the last six years. During that time he had done some remarkable work.

He had built up to an amazing degree a friendship with all with whom he had come in contact during those years, a friendship which one would almost say was inherent in the gas industry. He had served the Institution and the industry amazingly well in the way in which he had built up that friendship.

An Honourable Record

The record of his work, his own personality and everything else, simply bred confidence in the industry, of which they were all so proud. His friends had felt that they would not like him simply to pass out like an old soldier with nothing but an honourable discharge, but that he should have something a little more tangible of their kindliness, good feelings and appreciation of all that he had done.

He asked Mr. Stewart to accept a small book which bore the signatures of all those with whom he had come in contact and who had shared in the presentation. The book was inscribed: 'Presented to Mr. E. J. Stewart, M.INST.GAS E., on the occasion of his retirement from the Chairmanship of the Gasworks Safety Rules Committee of the Institution of Gas Engineers, by members of the Council and officers of the Institution and by members who have worked under his Chairmanship since 1948, an appreciation of his many years of service to the Institution and as a token of their personal regard.' With the book was a cheque, which he hoped Mr. Stewart would use to purchase something for his home, which would give him a constant reminder, if such was necessary, of the many happy times he had had in the industry and of the many friends he had left behind.

Mr. Stewart, in acknowledgment, said if ever there was a committee which was a team committee, it was the Safety Rules Committee. It was one of those committees in which everybody had to pull his weight, and he had never known anybody who did not pull his weight. He had had a wonderful apprenticeship. He served under his two predecessors, the late Thomas Hardie and his friend Mr. F. M. Birks, and was well taught. If any work he or the committee had done resulted in a greater measure of safety or relief from anxiety, all he could say was that what he had done had been well worth while.

There followed during the rest of the morning and in the afternoon the presentation and discussion of reports and papers arranged by the Institution. The second day was, as last year, given over to reports and papers arranged by the Research Committee of the Gas Council.

The Second Day

The **President,** in taking the chair on the Wednesday morning, said it was customary in the old days for the Chairman of the Gas Research Board to take the chair on the second day. He had extended to Colonel Sir Harold Smith a very pressing invitation that he should take the chair on this occasion, but he was unable to accept for two reasons: first, he had a very important meeting in connection with the Gas Council which he could not possibly put off: and secondly, he felt that the Institution had his confidence to such an extent that he would prefer that the President of the Institution should remain in the chair when the research reports were considered.

Several of those who had been associated with him over a long period of years on the Council of the Gas Research Board would remember that a few years ago he was one of those who opposed the change when there was a move to disband the Gas Research Board and to merge it under Gas Council control. After the Gas Research Board had decided to agree to the proposals of the Gas Council, he accepted the decision loyally, although he still felt that a mistake had been made.

Greater Sense of Direction

He now wanted to say, without hesitation, that he had realised during the last few months that there was a much greater sense of direction than was ever experienced in the old days. The various projects were considered very carefully, the advice and experience of outside scientists was obtained, and once the project had been decided upon there was an urgency which was very marked. He said this for two reasons. The first was that he thought they should give credit where credit was due. There was no doubt at all in his mind that the Research Advisory Committee of the Gas Council was doing something really useful for the gas industry and they would benefit very materially as a result. Secondly, he wanted to encourage those members of the Gas Research Advisory Committee—Dr. Dent, Dr. Griffith, and their staff—and to help them to feel that they appreciated the increasing amount of work they were doing, so that they might go forward with still more zest and enthusiasm for the great work which involved the whole future of this great industry.

There followed the presentation of reports on research at the London and Birmingham Research Stations of the Gas Council by Dr. R. H. Griffith and Dr. F. J. Dent, and the 44th report of the Joint Refractories Committee; and papers on 'Corrosion and Preservation of Gasworks Plant,' by L. A. Ravald; 'The Wind Load on a Spirally Guided Gasholder,' by W. A. Simmonds; 'Heat Transfer and the Cooking Process,' by E. W. B. Dunning; and 'Experiments with Common Balanced Flues,' by C. H. Purkis and W. J. Bennett.

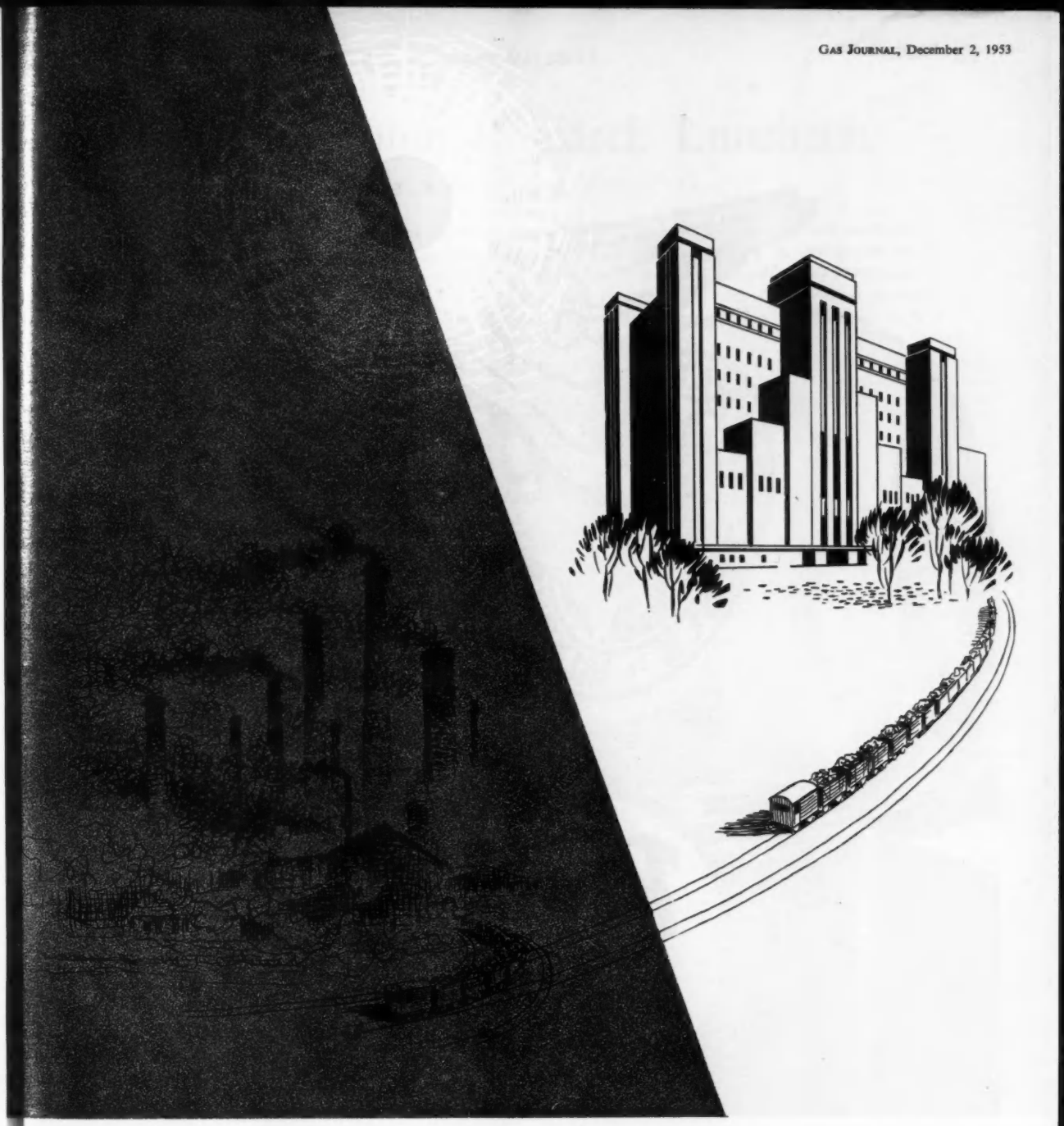
Finally there was the usual omnibus vote of thanks to all who had contributed to the undoubted success of the 19th research meeting, from the authors of reports and papers to the indefatigable officers of the Institution. The vote of thanks was proposed by Mr. C. Johnson, Coal Officer of the Gas Council, and seconded by Mr. A. R. Bennett, Research Manager of Radiation Ltd., who testified to the value of the whole meeting to the appliance side of the industry.

Our report of the Research Luncheon appears on p. 593. In subsequent issues we shall publish impressions of the technical sessions of the meeting by our observers.

More Than 9,000 pre-war council houses belonging to Bristol Corporation are to have gas water heaters and wash basins installed in bathrooms. The cost is estimated at £287,000 and the work will be spread over three years.

GAS AT THE BUILDING EXHIBITION

The centrepiece of this view of the Gas Council's stand at the Building Exhibition at Olympia is the Sapphire balanced flue space heater which demonstrates the means of installation. In the background are some of the display panels which show graphically the extent to which gas and coke appliances are being installed in new housing estates throughout the country. To the right is the working exhibit of gas water heaters.



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The Autumn Research Luncheon

Prospects of Finding Natural Gas

Mr. Kenneth Pickthorn, Parliamentary Secretary to the Ministry of Education, and Sir Ben Lockspeiser, Secretary of the Department of Scientific and Industrial Research, were the principal guests at the 19th Autumn Research Luncheon of the Institution of Gas Engineers at the Savoy Hotel on November 24. Responding to the toast of the guests Mr. Pickthorn said the reason he was there was to personify his Ministry's desire to be helpful to the Institution and its consciousness that it had done its best throughout to be helpful to the Ministry.

THE PRESIDENT, Mr. J. T. Haynes, proposed the toast of the guests, among whom he mentioned representatives of universities; authors of reports and papers; members of kindred associations; foreign visitors (especially M. M. Brabant, Immediate Past President of the International Gas Union); the Chairman, Deputy Chairman, and members of the Gas Council; the Press; and representatives of the Ministries of Fuel and Power, Education, Supply, and Agriculture and Fisheries.

A Proud Heritage

'We are proud of the gas industry, in which many of us are in the succession of father and son,' concluded Mr. Haynes. 'We are proud of our Institution which for 90 years has furthered the interests of the gas engineering profession, and we are proud of the guests who have honoured us today.'

MR. KENNETH PICKTHORN, Parliamentary Secretary to the Ministry of Education, responding to the toast, said he was particularly glad to attend under the Presidency of Mr. Haynes because he knew how sympathetic and helpful he had always been about educational co-operation, about co-operation with the Ministry, and above all, co-operation with local educational authorities. The Ministry had been very conscious of the wisdom and initiative and willingness to co-operate which had always been shown by the Institution both about technical education and about research.

One aspect of the Institution's good deeds to which reference had been made and which perhaps he ought to emphasise was its new activity in connection with the teaching of management. He wanted particularly to say how much interest had been taken in that experiment and how glad the Ministry was to know that everybody connected with it thought it had been successful.

Smog and Coal Waste

Sir BEN LOCKSPEISER, Secretary of the Department of Scientific and Industrial Research, proposing the toast of the Institution, said smog and coal waste were two sides of the same medal. Smog was not a new word for a new thing. It was a very old word for an even older nuisance. It was going strong over 100 years ago and for very much the same reasons which existed today. In the matter of smog the gas industry had a really good alibi, and only its modesty debarred it from depicting Mr. Therm floating over the smog in a frilly nightie wearing a large sized halo. The gas industry contributed virtually nothing to the 2½ mill. tons of smoke and grit which was our net annual output in this country and, as far as one could estimate, not more than 2% of the 5 mill. tons of sulphur dioxide put into the atmosphere annually came from gasworks, and as little as 6% came from the burning of coke, and nothing from the gas it made.

If smokeless zones became fashionable, the gas industry, among others, would have a very big part to play. He had often noticed the gas industry referred to as a two-fuel industry, but it should be better and more widely known as a two-smokeless-fuel industry.

Anxiety About Supplies

If it was called upon to play that part, it might have considerable anxiety about sufficient supplies of suitable raw materials. It already had those anxieties, for they were eating into their reserves of good caking coal—the higher kind of caking coals—in a disproportionate manner, and it was inevitable, with the increase in mechanical methods of mining, that there would be an increase in small coal and fines. Gas engineers, scientists, and technologists were paying great attention to learning how to make gas from coals of low coking quality, non-caking and ungraded coals, and there was good reason to hope that the important problem of making gas from coal of size or quality hitherto considered to be of little value for gas making would reach a successful practical conclusion. The study of the problem was not confined to the research laboratory. He understood that a pilot plant exploiting a commercial process which existed on the Continent and using low grade coals for gas making was to be erected by the North Thames Gas Board. In addition, the Lurgi pressure process, using oxygen, established for the gasification of brown coal, had now been tested for bituminous coal, including British bituminous coal from 1 in. downwards. No doubt those processes were capable of considerable improvement and development, but they were valuable contributions to the all-important problem of making use of low grade non-caking coals and ungraded coals for gas making.

'I Hope You Strike Oil'

Referring to the exploration for natural gas, Sir Ben said there was good evidence of sufficient natural gas existing in various parts of Great Britain to make this a very reasonable venture. According to the geological survey, features of rocks underlying parts of Eastern England were such as to encourage the belief and the hope that rocks producing gases might be found and structures capable of acting as underground reservoirs. If underground reservoirs were found, they might be valuable in the future as storage for meeting peak loads.

The D.S.I.R., through the geological survey, had its own deep boring programme chiefly to get geological information, and that information might be of very great value in interpreting data in the early stages of exploration for gas. If they started looking for something in particular, they did not always find it. They had to take the ups with the downs. They knew all about the downs; anybody who engaged in systematic experimental work knew what he had to expect in the way of downs, and they knew that was the inevitable price they had to pay in order to make progress at all, but sometimes the ups were surprisingly remunerative. The first deep bore put down by the geological survey revealed a new coal field area containing at least 300 mill. tons of coal linking the Cannock and Warwickshire coal fields in South Staffordshire, at a depth of about 3,000 ft. with seams 5 ft. to 8 ft. thick—admirably suited for mechanical mining. A deep bore hole put down by an oil company in the North-East of England was in a search for oil. They did not find oil but they found extensive deposits of potassium salts, which was a valuable asset. He imagined the discovery of those deposits amply repaid, many times over, the cost of all the deep borings ever done in this country or those which would probably be done in the next 25 years. Incidentally, they also found some gas, so that if he said to Sir Harold Smith, 'I hope you strike oil in the accepted sense,' he trusted the Gas Council would not misunderstand him.

Eager to go Forward

MR. W. K. TATE, Senior Vice-President of the Institution, replying to the toast, said the nationalised gas industry of this country inherited a very considerable pride from the former companies and municipal undertakings and a very real idea of service to those whom it supplied. The Institution had its proper pride and was anxious to go forward and serve the industry with which it was linked. It would do everything it could to ensure that the most modern type of plant for gas making was brought into use so that the British public might have a gas industry second to none in the world.

M. BRABANT (Immediate Past President of the International Gas Union) conveyed greetings from all his Continental colleagues—from France, Germany, Holland, Switzerland and Belgium. He said he was glad to see that the spirit of the International Gas Union remained.

MR. G. E. CURRIER proposed the toast of the President, to which Mr. Haynes briefly replied.

Gas Board Wins Appeal.—The Ministry of Housing and Local Government has allowed the appeal of the North Western Gas Board against the refusal of the Lakes Urban Council to allow it to discharge 320,000 gal. of effluent from the Ambleside gasworks into the public sewers. At the public inquiry it was stated that the board wished to discharge the liquid at the rate of 2,250 gal. a day but the Ministry suggests that the council and the Gas Board should meet to discuss 'some degree of flexibility of this arrangement.'

BECKTON'S IRON ROAD

A fairly light-hearted investigation conducted by G. W. BATTISON, Editor of Gas Service, into the unique railway system which is a feature of the Beckton Works of the North Thames Gas Board.

THE MAP in the A.B.C. railway timetable is much too complicated to serve any very useful purpose, but it does emphasise the extraordinary degree to which the railway services of this country are interlinked. The fact that even the most careful examination will not reveal that lunatic stretch of track from Oyster Creek to Far Tottering in no way denies its existence. Indeed, Emett's famous line is much more plausible than many sections of the A.B.C. map. The point I am trying to make is that because Emett's railway has a Cornish ring about it, that is no reason why it should not be connected, via some nightmare branch line, to the railway system at Beckton Gasworks. No one who has visited Beckton—and, after all, who hasn't?—can fail to spot the connection. What is less clear is how much each owes the other.

One cannot be inside the 280 acres of the world's largest gasworks more than a few minutes before a clatter and a whistle heralds the presence of a line of wagons hauled by a genuine Emett Locomotive, complete with fantastically short wheelbase (5 ft. 6 in.), absence of driver's cabin, yards of plumbing, and a general aura of steam-injected whimsy.

Having on many occasions watched with delight the busy comings and goings of these trains, I wanted to know more about them. But investigation showed that neither the gas nor the railway Press had published anything about Beckton's railway. Even Mr. Stirling Everard, who unquestionably knows the exact number of rivets in all the rolling stock and its average speed per hour on any given day since 1870, had omitted to include the information in his exhaustive history of the works. In the circumstances there was only one thing to do and I did it.

My enquiry was not of the microscopic, technical variety; it was essentially casual and haphazard. It reawakened echoes from schooldays, memories of hanging over railway bridges, making diffident overtures to grizzled engine drivers, and feeling a strange stirring of the blood at the sight of bright paint, polished brass, and well-oiled pistons. But it also succeeded in discovering a few interesting facts about this, one of the largest privately-owned railways in the British Isles.

I found that Beckton's trains have more in common with Emett's than mere superficial appearance. The essence of the Emett railway lies in its ability to do a good job against almost overwhelming odds, and it is a similar assurance which enables Beckton's trains to chug bravely along water-logged track and charge up gradients which would make a motor cyclist turn pale.

Beckton's railway is 83 years old, as old as the works itself, and the remarkable thing is that one of the eight original locomotives, affectionately known as 'Old Number One,' built by Neilson, is still doing a full day's work with no hint of retirement. Quite rightly, it is regarded with veneration and driver L. Steadman polishes its brass fittings with loving care. When I clambered on to the footplate he was bemoaning the previous day's rain and hastily bringing back the shine to its bright paintwork. Old Number One has 38 sisters, 16 of them Neilson built—a famous name in loco building circles, and now amalgamated into the North British Locomotive Company. Others bear such builders' names as Peckett, Barclay, Bagnall and Hunslet, all of them revered in the business—and cult—of loco manufacture. And two of the fleet (if that is the word) were actually built in the workshops at Beckton. All are of the 0-4-0 type with four coupled driving wheels and no bogies, and are capable of traversing curves as small in radius as 45 ft. Actually, there is only one curve as sharp as that on the works, the normal minimum radius being 80 ft. An odd thing is that a Beckton loco's age cannot be guessed by general appearance unless, of course, one is an expert. Number One looks far more modern than some locos built over 30 years later. I found that most of the new engines came within the numbering range of 1-10, the explanation being that most of the replacements have occurred from the older locos which originally had the lower numbers and the new locos have taken on the old numbering. All are painted a cheerful green, but with some you would never know it. Cleaning varies in intensity, due partly to whether a loco has a regular driver or shift drivers; the latter predominate slightly.

Variety of Types

Side tanks are more numerous than saddle tanks; among the latter are a few of the 'Jumbo' type, low built to enable them to run into retort house coke-holds back in the old hand-work days to bring out pan-ash and coke. Old Number One, as if to demonstrate its position as oldest inhabitant, boasts a tank beneath the boiler. Few of the locos have cabs, the drivers putting up with exposure to the elements—and there are usually more elements at Beckton than most places—in order to have maximum visibility. Most of the locos have 10 in. × 18 in. cylinders and 2 ft. 9 in. diameter wheels, and in contrast to the obscure rites performed by main line express drivers in the sanctity of their cabs, these locos *appear* to be easy to control. More probably it is the drivers' skill which accounts for their nonchalant accuracy.

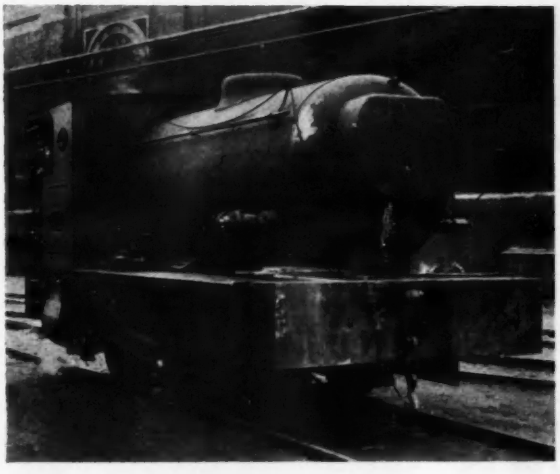
There are two oddities deserving particular mention. These are fireless type locos which lack the normal digestive organs of the coal-burning variety and lead an unnatural and somewhat clinical existence, requiring to

be filled with steam every three or four hours. This to some extent compensates for their lack of independence by enabling them to enter those inflammable areas where honest, warm-hearted locos are rigidly refused admission.

There are—and I mention the fact with some reluctance—two other locos which are rather outsiders. These are really the fortieth and forty-first on the works but are seldom counted because they are *electric*. They are tied to the coke ovens and are, of course, excluded from the camaraderie of the engine sheds. One of these has a direct electric drive and the other an electro-hydraulic drive. The coke car which is drawn by one of these locos weighs 65 tons and carries 12 tons of coke.

Mention of the engine sheds reminds me that the degree of bustle round there at key times of day is most impressive. Locos are run into a shed where drivers can make use of the new fluorescent strip lighting in the inspection pits to check that all is well. Nearby is the roundhouse with its turntable.

So much for the locos. What of the rolling stock? Roughly speaking, this falls into three categories: Main line stock on the works; similar stock which, until the nationalisation of the railways in 1948, was the property



Portrait of a cold-hearted locomotive. No fire burns within its steel breast, since it runs on steam which is injected every few hours.

of The Gas Light and Coke Company; and wagons for internal use only. The first two groups require little comment, except perhaps to remark on the extraordinary variety of design. However, this is certainly no greater than can be seen in any shunting yard. Much more interesting are the 770 wagons used only on the works—and built on the works too. These look less like Emett rolling stock than refugees from the Stockton and Darlington line. They are small in comparison with ordinary goods wagons, crude in design, and lacking such refinements as oil-filled axle boxes, etc. Of the 770 wagons of this type 178 can be tipped, some 205 are of the steel hopper bottom type for handling coal, and over 330 are of the more conventional mainline type.

Much grander are the steel hopper trucks, 16 of which make up each train taking coal from the main hopper to the storage ground. The loading of these trains is one of Beckton's show pieces. Each train backs underneath the hopper until the rear truck presses against the rear buffers. This releases a locking system and enables the engine driver, by merely pulling a lever, to cause 16 quadrant doors to rotate simultaneously, feeding coal from the overhead hopper into all the trucks at once. The chutes are set at such a height that coal stops flowing immediately each truck is full. The driver then operates another lever which, by a compressed air system, closes all 16 doors, and hey presto! 80 tons of coal have been loaded in one minute. If necessary, six trains can be loaded simultaneously. The air cylinders from

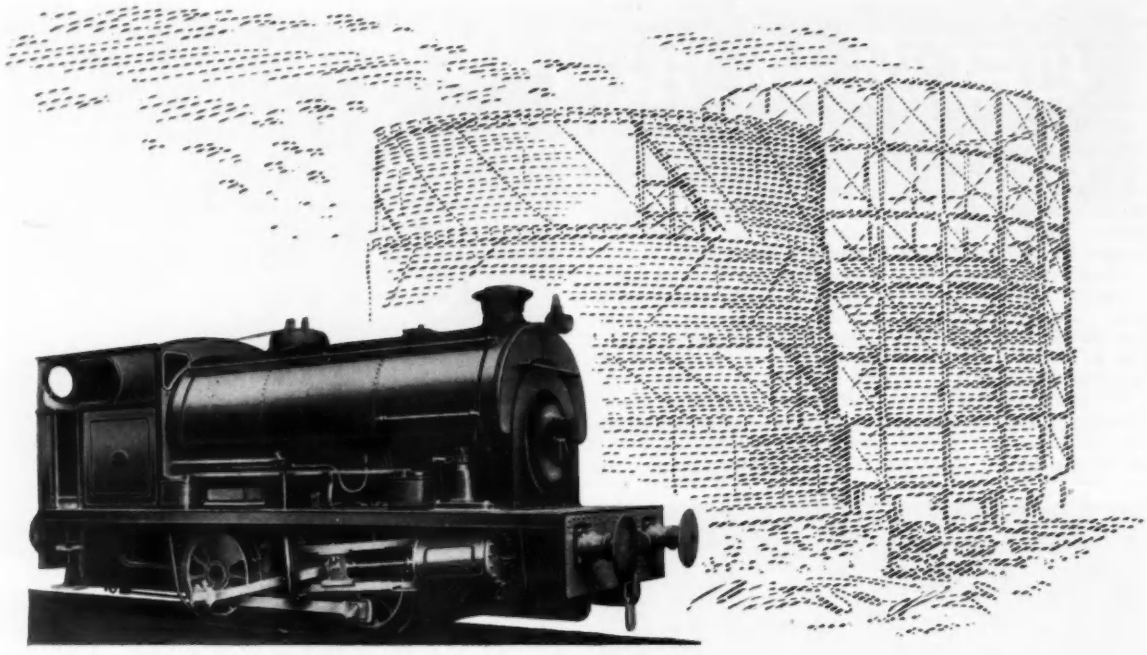
Beckton's pride and joy, 'Old Number One,' which has been in use since the works was built in 1870 and, as our photograph shows, does not lack spit and polish.

the locomotive are again brought into use when the train reaches its destination at one of the retort houses, and the 16 trucks are emptied simultaneously.

It occurred to me that it must be no small task maintaining all this rolling stock in good running order. Enquiry brought me to Beckton's railway hospital, actually a part of the huge general workshops. Here was Swindon on a small scale. In a positive hive of industry, dismembered locomotives were receiving attention from a body of fitters. Three of them were fitting new tubes in the boiler of one elderly patient. The shop foreman explained that such first aid treatment as boiler tube cleaning or replacement, providing new sides, or patching or replacing fire-boxes, is required at vastly different intervals—anything between three and thirty years—by different locos, dependent on how heavily they have been worked. Nearby was a wheel lathe for re-treading the flanges on loco wheels. One of the few such lathes in London, it often copes with jobs for other works in the Board's area. The focal point of this part of the shop was a newly painted loco, gleaming fresh and green against the dull parts of its brethren.

Remember the nest of pterodactyls in 'The Lost World'? It cannot have looked much more fearsome than these prehistoric monsters gathered near the engine sheds.

(*Continued on p. 597*)



ELEVEN

Peckett Locomotives in service

at Beckton Gas Works

The first Peckett locomotive delivered to the Beckton Works 33 years ago, is still pulling maximum loads. The locomotives now in service have 10", 12" or 14" cylinders and are of the 0-4-0 Class. All have been adapted from the Peckett range of standard designs. Steep gradients and severe bends are a feature of the Beckton Works track —conditions which Pecketts cope with comfortably, putting them among the most faithful servants at the works.

PECKETT

INDUSTRIAL LOCOMOTIVES

Products of Experience

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PECKETT AND SONS LTD., ATLAS LOCOMOTIVE WORKS, BRISTOL, 5.

Telephone: Bristol 55346 **Telegrams: "Peckett" Bristol.**

These three pictures were taken in Beckton's workshops. Above is a wheel lathe for re-treading the flanges on loco wheels.

Like some of us humans, locomotives can suffer from their tubes. The patient on the slab above will soon be back on the rails.

Beauty treatment for No. 40. A fresh coat of bright green paint has transformed a tramp into a dandy.

Unless one has a specialised interest, it is, I suppose, inevitable that the casual visitor should be more concerned with the locomotives and trucks than with the rails on which they run. It is obvious that without the track the rolling stock would be useless, but I confess that I never realised how much real effort and careful planning went into the job of keeping the railway 'on the rails.' Seventy miles of rail—nine miles of it elevated—provide the complex web of rail communication in the works, linking the various plants and stocking grounds; and the system includes no less than 400 sets of points and crossings.

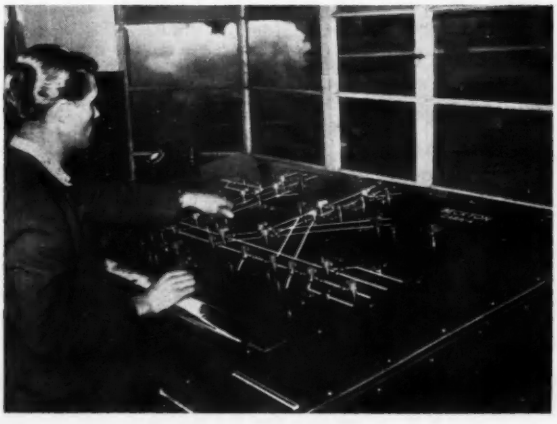
Underneath the arches comes one of the side tank brethren, into the gloom of the roundhouse with its turntable.

Under the very best conditions the maintenance of this system—which is, of course, standard gauge throughout—would be a formidable task. But at Beckton conditions are far from ideal. Much of the works is below river level, and despite the efforts of a complicated drainage and pump system, flooding is fairly common. The effect on railway line of water lying about is serious. Under the guidance of Mr. G. Shaw, the Railway Engineer and Traffic Manager, who is responsible to Mr. H. Bradley, the Station Engineer, I watched the behaviour of certain 'black' sections of track as trains passed over them. There was a surprising amount of 'give,' as black mud rose over the sleepers. Some of these sleepers—about 9% to be precise—are concrete instead of wood, a product of timber shortages during the war years. They are not particularly popular, having a tendency to snap under strain. Proper sleepers are still somewhat difficult to come by, since British Railways have first pick of those available.

Another problem of track maintenance at Beckton is the difficulty of replacing track during the almost continuous demands being made upon it. As on main line railways, much of this work is done at night, and to save time considerable lengths of track are assembled in readiness and placed in position *en bloc*. To assist in these jobs 15 loco steam cranes are available, the largest of them weighing 30 tons—10 tons more than the smaller locos—but, of course, permanent way repairs constitute only a small part of their duties.

The Permanent Way Department consists of 73 men under the direct supervision of a foreman and assistant foreman, and of these 60 are platelayers and directly engaged in track maintenance and renewal, the remainder consisting of points fitters, points cleaners, signal fitters, and so on.

There remains one other essential aspect of the railway which deserves a word. I am thinking of the signalling system. With 39 locomotives at large it is obvious that something more than good luck is needed to prevent a nasty situation. The answer is provided by an extensive signalling system, parts of which are extremely modern, such as 'A' signal cabin situated at the crossroads and level crossing by Beckton's main road. Here, on a large panel, is a replica of the track layout, and by means of



Left: *Seated before a replica of the track layout, the operator in 'A' signal cabin uses the electric controls to marshal rail traffic in his area.*

Right: *Here an across the track view of 'A' cabin. It is at the crossroads and level crossing by Beckton's main road.*

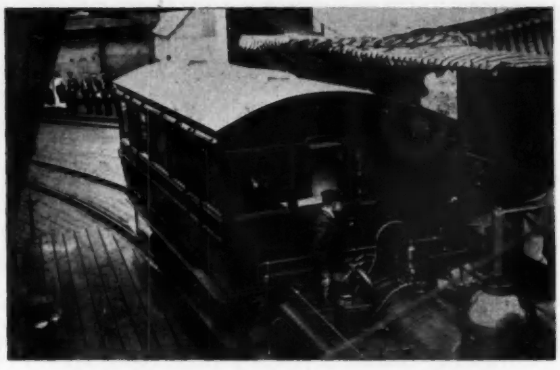
its electric controls the signalman can marshal traffic over a wide area. The job requires a good deal of concentration, and although to some extent the system is foolproof, considerable reliance must still be placed on the human element.

There are lesser signal boxes, and for the rest points are hand operated by 'rope-runners.' I have purposely refrained from mentioning them before because they deserve a little space to themselves.

Rope-runners are partly loco firemen and partly shunters. Their principal job is to couple and uncouple wagons, and operate points. The term 'rope-runner' is said to be peculiar to Beckton and it derives from the days when shunting was done by manpower hauling on ropes and wagons were coupled by ropes. It is a familiar sight at Beckton to see these fellows galloping down the track, for they live up to their name—on piece work they have got to! Very often they function as assistant drivers, and it is usually from amongst them that new drivers are selected. Incidentally, most loco drivers at Beckton are men who reached that job after a term as rope-runner or in some other capacity on the works; only a few came with loco driving experience from the outside world.

I enjoyed watching the railway systems at work and the ceaseless activity of Beckton's iron road. There was always something going on—coal being transported to retort houses, coke on its way to the screening plant, and the constant moving of ore, ballast, sand, ash, and many other heavy materials from one part of the works to another. It seemed that wherever I looked, these stout-hearted, sturdy little engines were hustling about their business, clattering along the track with an infinite variety of loads. To ride on, they are far removed from the comfort of the Bournemouth Belle, but they might be worse. It is an odd sensation to be suddenly enveloped in dense smoke which blots out everything, and riding blind until a change in the wind direction or an adjustment to the controls suddenly restores visibility.

There are many other things I could mention—such as Beckton's own passenger station which is linked to the main line and until 1939 served the men operating on shift work. The station is still used by British Railways staff for handling the goods traffic and coke traffic to and from the works and there are at least ten trains a day to be handled. However, this and many other points about the railway must wait until another occasion.



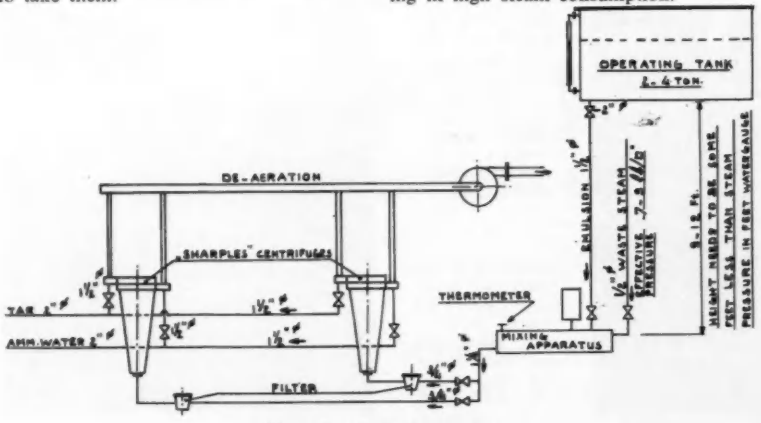
State occasion of yesteryear. This is the observation coach which was later destroyed by enemy bombing. The passenger? King George V.

As I have shown, Beckton's railway has just about everything—except perhaps a ghost train. I have heard nothing about one, but it may be a secret locked in the hearts of a few stout men who, during cold winter nights when the holders were low, saw the spectral shape of some locomotive long consigned to the scrap yard, flashing silently by the benzole plant, the points set against it, the driver's fingers upraised in a ghastly salute. A little fanciful, no doubt, but if there *is* a ghost train—and somehow I feel all real railways should have one—I fancy it would be the luxurious saloon coach which with its table bearing a map of the works, and drawn by No. 31 loco, conveyed important visitors, including royalty, until Hitler's bombs ended its term of glory. It has not been replaced; it seems a pity.

Dealing with Water-in-Tar Emulsions

WRITING from Holland, Mr. D. M. J. Kagchelland, of the engineering staff of the Municipal Gasworks of The Hague, explains that at his works he has experienced trouble with several tar emulsions. The value of these emulsions, he states (and he refers to the paper given to the Institution of Gas Engineers in June, 1952, by Mr. S. C. Porter, *Gas Journal* of July 30, 1952, p. 250), was so low that eventually the tar distillers refused to take them.

The problem, he goes on to say, was solved by an emulsion-steam mixing apparatus which he developed. He encloses a diagram of the apparatus, which we reproduce. Heating to temperatures of 150°F. to 180°F. apparently gives the best conditions for centrifuging. Formerly this was attained by steam coils in the operating tanks. The system, however, gave trouble due to the deposition of tar on the coils, thereby seriously interfering with heat transfer and resulting in high steam consumption.



Water tar emulsion scheme.

Mr. Kagchelland states that with his method it is possible to inject waste steam into the water-in-tar emulsions. There is an increase in the water content in the first instance, but he finds that the centrifuges can now deal with the emulsions without any difficulty, producing tar with a water content between 1% and 3% even when the emulsion contained up to 50% of water. No longer do the outlet nozzles of the centrifuges become blocked, and the system works equally well with either coal gas tar or water gas tar. No surplus storage for the emulsions is now required, and, of course, the distillers are perfectly willing to pay market prices for the tar which they are offered. The author adds that the fitting is simple and that the cost is low.

EMPLOYEES of Newton Chambers & Co., Ltd., Thorncliffe, with more than 10 years' continuous service will in future be eligible for a good service gratuity on retirement at 65 or over. Gratuities will range from 10s. a year for 10 years' good service, to 50s. a year for 50 years. The scheme dates officially from January 1 of this year, but, as a concession, the directors have approved the inclusion of employees who retired aged 65 or over, last year. It is hoped to arrange for the first presentations soon after Christmas.

Gas and Electricity at Manchester

Conference Impressions by 'Ashton'

THE second day of the Conference in Manchester held in connexion with the excellent Fuel Efficiency Exhibition was an interesting occasion particularly in the morning when two papers were presented, one by Mr. W. F. Howell, Group Industrial Engineer of the North Western Gas Board, on The Efficient Use of Gas in Industry, followed by a similar paper on Electricity by Mr. J. L. Bernard, Chief Technical Officer of the British Electrical Development Association. Gas made quite a good show. For one thing it gave rise to an interesting discussion whereas the electrical paper produced nothing more than a heated protest.

Mr. Howell's paper was admirably suited to his audience. The Chair was taken by Mr. Neil H. Turner, of the iron and steel industry, who ruled out any comparisons between gas and electricity; not that either speaker gave occasion for censure on these lines. Mr. Howell opened with a brief account of the advantages of gas as a clean, easily controlled, highly refined fuel and of its high degree of coal economy. He stressed the point that the advantages of gas are secured to the full only in appliances carefully designed and adapted to its use. 'The design of efficient gas fired equipment is a specialist's job,' he said. The prospective user should consult his Gas Board's industrial engineer or go direct to a reputable firm of appliance manufacturers.

Insulation and Modern Methods

For instance, the use of ordinary insulation is not so economical as that of hot-face insulation. With the latter the reduced bulk of material in the walls can reduce the heat capacity of the furnace. In a comparison, 14% reduction in gas consumption was achieved. But heat capacity is reduced to the minimum where combustion is completed in a burner tunnel leading to what is called 'furnaceless heating.' With regard to insulation generally, the cheapest is rarely the best. And that spirit ran through Mr. Howell's presentation of his subject, a spirit which should be made the most of in advocating gas as a fuel. The actual fuel cost may be high, but the collateral advantages, in labour-saving, in the reduction of spoilage, in the elimination of storage costs, must always be stressed.

That natural draught is to be preferred is understandable, but to get the best result it must not be excessive—in any case excess air is no necessity with gas—and Mr. Howell stressed the importance of this point. Natural draught appliances should be so designed that correct combustion conditions are obtained with a short length of primary flue which is then fitted with a diverter before final discharge to atmosphere. Attention to this point reduced time of attaining the working temperature in one instance from 24 to six hours. Gas lends itself readily to the maintenance of constant temperature by co-ordination of air/gas ratios with draught conditions.

In large continuous furnaces the recovery of heat from waste gas can be fully realised. One was reminded that it is pushed to the extreme in the continuous kiln used in the pottery industry, where heat is recovered first from the hot ware and, later in the process, the products of combustion serve in the preliminary stages of heating the stock. Here, too, in many cases direct heating—always the most efficient—can be used, but if muffles are required their material must be suitable to the temperature, mild steel at low temperature, heat-resisting steels up to 1,000°C. and carborundum above. In this connection Mr. Howell remarked that the interesting radiant tube could often take the place of the muffle. The greater efficiency of direct firing was emphasised by the instance of a continuous gas-fired Dressler kiln of the muffle-type which when converted to open-firing resulted in a gas-saving of 42% 'with an increased output of better quality work.'

Instrumentation

Another remark well worth underlining is that 'the true thermal efficiency of an appliance is the heat input per unit quantity of stock perfectly treated.' In other words the use of a more refined higher priced fuel can often be justified by the elimination of wasters.

Among other subjects touched upon was the value of reasonable instrumentation and particularly of individual metering. One wishes that this latter principle could be realised throughout gas manufacture as well as utilisation. There are several other ways in which more effective use of gas can be realised. The provision of fins or studs to heated surfaces greatly increases the speed of heat transfer. The use of the immersion tube (with gas burning in it) is becoming increasingly popular in liquid heating—as much as 66% reduction in gas consumption was achieved in this way in the large scale production of potato-crisps—quite an industry in these days!—as against external heating. Submerged combustion can be used for heating liquids not subject to deleterious contamination by products of combustion. Infra-red radiant heat used for drying and other medium temperature processes can be improved by combustion with convection heating. Mr. Howell wound up with a repeated warning against the badly designed appliances.

The discussion was cordial as well as interesting, producing a number of detailed questions which were competently handled where sufficient data were available. On the other hand the electrical paper failed to rouse any discussion, except that one gentleman availed himself of the opportunity to ventilate his dissatisfaction with the high charges which were proposed for bringing a cable to his factory. Even so his average cost would be more than a penny per unit. He could generate himself at less than that.

The paper itself left no doubt that electricity has very many attractions in the application of power to machinery, applications of which there are, of course, many examples in the modern gasworks. Many specialised heating problems can also be effectively and elegantly dealt with by the new techniques of induction, dielectric and high frequency heating. Further, electronics will have its part to play in the gasworks as in so many other industrial processes where fine control is essential. Much was made of fluorescent lighting. One had no quarrel with all that. But one did sympathise with the last speaker who asked why, as coal was short and as the worker needed some three times more power to his elbow, we should fritter away electrical power on what he called such 'useless' luxuries as ice-cream coolers.

AN UNUSUAL DEMONSTRATION

HOME SERVICE advisers attended an unusual lunchtime demonstration of the new Parkinson Renown Five cooker, at Terminal House, Grosvenor Place, on November 17. They saw a complete meal for six people cooked in half an hour on the cooker's eye-level twin grills; when ready, the meal was served for them direct to the table in the attractive grill pan which is one of the many features of the Renown Five.

The meal included six chops, six pieces of liver, six kidneys, six rashers of bacon, six sausages, mushrooms, and tomatoes. In addition mashed potatoes and peas, nominally 'left-overs' from a previous meal, were reheated in the lower part of the grill tray. A unique feature of the Renown Five eye-level twin grills is that fish and meat can be cooked at the same time without any adulteration or merging of flavours.

The picture shows (left to right): Mrs. Mair Jones, South Eastern Gas Board; Miss M. Godby, Women's Gas Federation; Mrs. Eileen Murphy, Gas Council, and Miss Joy Houghton, of Watson House. Miss O. Janeway is preparing the meal, while Mr. J. Renton, of the Parkinson Stove Co., demonstrates other features of the Renown Five cooker.

SOUTH WESTERN RE-ORGANISATION

MR. HENRY F. H. JONES, Deputy Chairman of the Gas Council, and Mr. C. H. Chester, Chairman of the South Western Gas Board, addressed a meeting at Taunton on November 18 of the South Western Area Joint Council for Gas Staffs and the South Western Area Joint Industrial Council for the Gas Industry. Mr. Jones said that if the cost of coal had remained at the same level as in 1949 the gas industry would be paying £25 mill. less a year than it was now paying.

He pointed out that the economics of the gas industry were largely dictated by the price of coal. The continued rise in price had accelerated research into advanced processes for the complete gasification of coal; the provision of new plant previously considered unsuitable and the proposed expenditure of £1 mill. over the next five years in the search in this country for natural gas.

This search, involving £1 mill. expenditure, could not be called speculation, said Mr. Jones. It could mean a really important step towards changing the balance of production costs and ultimately to cheaper gas.

Mr. Chester reviewed the year's work with particular emphasis on the results obtained from joint consultations between the Board and its employees. He pointed out that the Board's integration scheme presented the greatest opportunity for substantial economies by the closing down of small inefficient works and the supply of gas to the area in bulk from pre-selected permanent manufacturing stations.

'We, in the South West, are at the tail-end of the chute so far as coal distribution is concerned,' said Mr. Chester, 'with the result that on an average we have to pay about 11% more than other area gas boards for delivered coal.' He emphasised that the sales drive had resulted in more water heaters being sold in the last three months than in the previous two years and the Board was top of the list for cookers sold per 1,000 consumers throughout the country. The Board had more money buried under the earth than actually shown above.

The Board had spent over £4 mill. since vesting day on new manufacturing plant and over £4,500,000 on consumer service. At the present time the cost of capital equipment represented £47 per consumer on the Board's books.

Dealing with domestic matters, Mr. Chester outlined plans for re-organisation which would become operative on April 1 next year. The new set-up, he said, would bring the Board and the management closer to its employees and would provide ample opportunity for promotion within the new framework. Every opportunity was to be given to employees to undertake training courses to fit them for promotion and at the present time 415 employees were undergoing training courses, of whom 367 were in receipt of financial assistance for this purpose. Last year these trainees had obtained over 200 examination successes, including four out of five Institution of Gas Engineers' Medals.

Mr. Chester concluded by emphasising the value of joint consultative committees which were proving the ideal means for the exchange of ideas and constructive criticism. He wished to see the work of those committees increased.

Consultations have taken place at Bradford between representatives of Bradford Health Committee and of local industry on the proposal to set up a smokeless zone in the central area of the city.

Gas Cooker Satisfaction

EFFORTS are being made in Glasgow to persuade the city council to allow the installation of electrical cooking circuits in its new housing schemes, but to date the Corporation has been loyal to gas. The South West Scotland Electricity Consultative Committee has been asked by the Electricity Board to co-operate in seeking a change of policy in Glasgow and an approach on these lines is being made.

The policy in Glasgow housing schemes to date has been to install gas cookers only; some tenants are stated to be asking for electrical cookers, but the feeling in Glasgow is that the majority of housewives are content with gas cookers and have still a fear—which is slowly being dispelled—of electrical appliances. The method of assessing for electrical charges has also been a factor which has influenced tenants away from electricity, in that some tenants are being charged for five apartments where the local authority lets the house as four apartments, the extra charge being in respect of a semi-separate 'dinette.'

This question of charging and assessing is important, and will undoubtedly influence present users to adhere to gas service where questions of tariffs do not intervene to the same extent.

The Address of the Institution of Heating and Ventilating Engineers is now 49, Cadogan Square, London, S.W.1 (T/N Sloane 1601 and 3158).

Orders and Correspondence for the sales, research, and development departments of Ewart & Son, Ltd., formerly at 35, Kentish Town Road, London, N.W.1, should in future be addressed to Works Road, Letchworth, Herts. (T/N Letchworth 1191/3).

FUEL EFFICIENCY EXHIBITION

THE North Western Gas Board's main stand at the Fuel Efficiency Exhibition in Manchester featured controls and other equipment designed to improve the efficiency of gas appliances. The use of gas in industry was illustrated by a display of proprietary products made in local factories throughout the North West in the manufacture of which gas played an important part. Improvements in fuel efficiency which the Board itself has achieved in its own gasworks was illustrated pictorially.

Part of the stand was devoted to showing the part gas and coke can play in the achievement of smoke abatement and smokeless zones. Daily throughout the exhibition, students from the Manchester Regional College of Art gave demonstrations of pottery making, using a gas-fired kiln.

The following industrial gas appliances were exhibited: Flame hardening plant by Surfard, Ltd.; automatic brazing plant by Standard Telephones & Cables, Ltd.; pottery kiln by Dowson & Mason Gas Plant Co., Ltd.; muffle furnace by Selas Gas & Engineering Co., Ltd.; section heating furnace by Thermic Equipment & Engineering Co., Ltd.

Coke appliances were represented by the Copperad auto burner, Janitor No. 1 Cokette boiler and Agamatic coke boiler.

North Western Gas Board's stand at the Fuel Efficiency Exhibition.

Visit to Ashmore, Benson, Pease & Co.

MEMBERS of the North of England Section of the Institution of Gas Engineers visited Stockton-on-Tees on November 20, where they were the guests of the Power Gas Corporation, Ltd., and Ashmore, Benson, Pease & Co. In the morning the members toured the construction shop which is part of the South Works development. Situated about half-a-mile south of the existing Parkfield Works, the new site extends to some 100 acres, and the construction shop represents the first stage in the firm's reconstruction programme. The floor area of this new shop covers an area of 132,000 sq. ft., and, on entering the vast building, the visitor is immediately impressed with the efficient, smooth running.

The first stage is laid out for the manufacture of general mild steel, stainless steel, and non-ferrous platework as required by the gas, chemical, oil, and iron and steel industries, and is equipped to deal with plates up to 2 in. in thickness. Twelve overhead cranes are provided, the heaviest being of 50 tons capacity, and the crane tracks in the two heavier sections are designed to take two 50-ton cranes per bay, so that, in the future, by the addition of further cranes it will be possible to handle virtually any size or weight of vessel. A stockyard served by rail, road, and an overhead crane, is provided at one end of the building for raw materials.

The shop consists of four transverse bays 85 ft. wide by 250 ft. long, and 30 ft. high to the crane tracks, and two longitudinal bays 65 ft. wide by 340 ft. long and 50 ft. high to the crane tracks, with the crane tracks of the low bays cantilevered out beneath those of the high bays. Easy transfer of materials from the high bays to the low bays and *vice versa* is thus achieved. The services building, containing the X-ray room, stores, sub-station, etc., is built alongside one of the high bays.

The main consideration influencing the choice of this layout was the large variety of work undertaken and the flexibility needed to maintain a balance between operations and control of work in progress. A further main factor is the desirability of carrying out the movement of materials by crane, other than those required to serve production processes. Following these principles, most of the processes are carried out in the transverse bays and the end 170 ft. of the longitudinal bays, while the main transfer, collection, and distribution of material is carried out in the high longitudinal bays. This layout leads to considerable economies in production by better machine utilisation and a larger output for an equivalent number of employees.

During their tour of inspection the visitors saw gas and chemical plant in various stages of completion, and spent considerable time observing many intricate welding operations in progress. Later a visit was paid to the firm's exhibition room and laboratories.

Afterwards, at the Queens Hotel, Stockton, the members were the guests of the Directors of Power Gas Corporation and Ashmore, Benson, Pease & Co. at luncheon. The Chairman of the Section, Mr. G. W. Perks, expressed his personal thanks to the Directors of the firm for their hospitality, and added that he thought it only fitting that Mr. F. L. Scaife should propose a vote of thanks on behalf of the Section, in view of his imminent retirement, and also because of his long intimate connection with the firm.

Mr. Scaife said the extent of the firm's activities were not merely national; they were world wide, and he complimented the management on their vision and on their enterprise. The new shop which they had inspected was in every way admirable, and it was a great tribute to the firm's confidence that within the next 18 months they would have completed extensions which would result in a 50% increase in ouput. This betokened well for the future, added Mr. Scaife, and he wished the firm every success in their enterprise.

Mr. R. W. Rutherford, Managing Director of the firm, said how pleased he was that the Northern Section of the Institution of Gas Engineers had decided to visit their works. The gas industry was one of their biggest customers, with whom they had done a great deal of business in the past and with whom they hoped to continue this collaboration in the future. Their first C.W.G. plant with mechanical grate was put to work in 1944, said Mr. Rutherford, only nine years ago. Since then 59 large plants had been erected in this country, and 20 abroad. They were very proud of this achievement.

A short meeting of the Section was later held under the Chairmanship of Mr. Perks. A paper entitled 'Some General Aspects of Gasholder Construction and Operation' was given by Mr. N. Broadbent and Mr. J. A. Walton, of Ashmore, Benson, Pease & Co., and this was followed by discussion.

[The paper is abstracted on pp. 602-4 of this issue of the 'JOURNAL.']

Wales Juniors at Llangefni

ACCEDING to a request from the managers of the smaller undertakings, the North Wales Section of the Wales and Monmouthshire Junior Gas Association has decided to visit, during the current session, some of the smaller works which by nature of their size and location would not normally act as hosts to a Junior Gas Association. The first of these visits took place on Saturday, October 31, when some 35 members joined their Chairman, Mr. C. W. Butler (Rhyl), in a visit to the Llangefni undertaking in Anglesey. This undertaking with an annual make of 11,500,000 cu.ft. of gas had something of unusual interest to show the visitors in a 35,000 cu.ft. welded gasholder which was originally installed in South Wales and had been dismantled and re-erected on its present site by the Mechanical Engineer's Department of the Wales Gas Board.

After inspecting the works, the members made a tour of the local housing estates of the Llangefni Urban District Council. Although the population of Llangefni is only 2,500, some 280 post-war houses have been completed, and a further 63 are either in process of erection or have been approved. Of these houses 230 have been serviced and carcassed by the local undertaking, and a cooker, a poker, and a wash-boiler installed in each house.

At a meeting held in the Bull Hotel, the Chairman of the Urban District Council, Councillor G. Evans, said that Llangefni had the best post-war housing record of any urban district council in Wales and the second best in England and Wales, and he paid tribute to the co-operation he had received from Mr. H. H. Watson, Manager of the Llangefni undertaking.

Responding to the address of welcome, Mr. A. Ifan Jones, J.P., remarked that so far as he could recollect, this was the first visit paid by a gas association to Anglesey.

A paper entitled 'The Accountant in the Gas Industry' was then read by Mr. G. A. Edwards, Internal Auditor to the Wales Gas Board. The paper (see p. 613) was followed bya discussion. In moving a vote of thanks, Mr. O. P. Cronshaw emphasised the part played by the junior members of the technical staffs in supplying the basic information necessary for efficient accountancy and expressed the hope that the accountants would, in their turn, back the technical staffs in their efforts to produce the cheapest therm by providing up-to-date financial statistics to use as their 'yardstick.' Mr. H. J. Stanley seconded the vote, and Mr. Edwards replied.

At the conclusion of the meeting, the members were entertained at tea by the Llangefni undertaking. A vote of thanks for the hospitality and facilities for the meeting was proposed by Mr. J. Woodcock, Senior Vice-President, seconded by Mr. E. Rundall, Rhyl. The Chairman of the Urban District Council and Mr. H. H. Watson responded.

Juniors visit Howdon

The Scottish Junior Gas Association (Eastern District) recently visited the Howdon undertaking of the Northern Gas Board. Those participating travelled by train from Edinburgh and on arrival at Newcastle were met by Mr. P. N. Lee and Mr. R. Aynsley, Junior Vice-President and Secretary respectively, of the Northern Junior Gas Association. At the Howdon works they were greeted by Mr. J. McManus, Works Manager, and his assistants Mr. Waiton and Mr. Lewis, who acted as guides during the tour. The visitors included Messrs. D. C. Elgin and J. T. Christie, Vice-President and Secretary, respectively, of the Scottish Association.

After the visit, the party travelled to the Grand Hotel, Tynemouth, where high tea was provided by the courtesy of Mr. J. E. White, General Manager, Newcastle Division, Northern Gas Board. Mr. Lee officially welcomed the Scottish Juniors to Newcastle. Mr. Elgin, in reply, thanked Mr. Lee and Mr. Aynsley for their kindness and Mr. McManus and his assistants for the excellent way in which the works tour was conducted. He also expressed thanks to Mr. White.

The Annual Dinner of the Edinburgh Gas Bowling Club was held on November 19. Among those present were Sir Andrew G. Clow, Chairman of the Scottish Gas Board; Mr. D. D. Melvin, Member of the Board; and Mr. D. Beavis, Controller, Edinburgh Division. Mrs. Melvin presented the prizes.

GASHOLDER OPERATION

FROM A PAPER TO THE NORTH OF ENGLAND SECTION, I.G.E., NOVEMBER 20, 1953, BY

N. BROADBENT and J. A. WALTON,

Ashmore, Benson, Pease & Co., Ltd.

THE column-guided type of holder has been in operation for over 100 years, but it was not until 1887 that firm design principles for construction were established by F. S. Cripps. These principles have not been amended to any great extent since. There are still a large number of column-guided holders in operation but new column-guided holders are now very rarely installed in this country where they are being rapidly replaced by the spiral-guided type. They still appear to be favoured on the Continent and countries where extreme climatic conditions are experienced, but since the war they are losing ground to the Wiggins in the U.S.A., and the spiral is now beginning to gain favour on the Continent.

The column-guided holder has proved a sound structure, but the high initial and maintenance costs of the guide framing, coupled with the fact that all carriages are not accessible for maintenance, are unfavourable features when compared with a spiral.

On the small and medium holders radial rollers only are fitted and it is estimated that only about one-quarter of the columns take the load of the carriages directly. On the larger holders the guiding mechanism consists of a combination of both tangential and radial rollers and in this case the load is more uniformly distributed, approximately three-quarters of the columns receiving the direct load.

Although it has been found that one flying lift will operate satisfactorily, the racking strains on the cups and dips and the wear and tear on the guiding mechanism preclude the possibility of curtailing the guide framing further and so save a considerable amount of material.

Spiral-Guided Holders

The spiral-guided gasholder was patented in 1887 and the first one was erected at Northwich in 1890. In the earlier types the guide rails were fitted internally and the carriages were fitted to the cups and bottom curb; some of these types are still in operation today. It is now standard practice to fit the rails externally at an angle of 45°. The spiral-guided gasholder has numerous advantages over the column-guided—mainly as follows:—

(1) Overall saving of steel due to there being no guide framing.
(2) The cost is approximately 15% less than for a column-guided holder.
(3) Spirals are easier to maintain—painting costs are reduced and all carriages are accessible for maintenance.

The stresses in spirally-guided holders were very fully analysed by Mr. S. M. Millbourne in 1937, but practical requirements are such that it is rarely necessary to carry out a complete analysis of stresses on the standard range of holders.

The clearances between the spiral rails and carriages on a spiral gasholder are very small. The float of the rollers radially is only $\frac{1}{2}$ in. and tangentially the clearance is only $\frac{1}{4}$ in. It is therefore essential that great care should be taken in manufacture and erection. In the workshops a very close check on the work is maintained, and a number of trial erections of sections of the tank and lifts are carried out as work proceeds to ensure that the parts are accurately made.

The same facilities are not, however, available at site, and great care is essential to erect the lifts true to shape. The first essential is that the perimeter of the foundation raft should be level. Levels should be checked at every rest block position, both front and back. Any variation of more than $\pm\frac{1}{4}$ in. from the average level should be rectified. It is now general practice to erect all lifts on the tank rest blocks except in the case of very small holders.

When the lifts are erected on the tank rest blocks the cup or bottom curb segments should be bolted in position, checked for circularity, and then finally riveted. The second row of sheets, rails, and vertical stays is then erected. Views vary as to whether the grip sections should then be fitted or whether the lift should first be sheeted and the grip fitted last. The former method is probably the more common practice, but the practice of fitting the grip last has the advantage that the rails and stays are not called upon to support the weight of the grip before they are stiffened-up by the sheeting. When this method is adopted the rail tops are lashed back to the tank top to prevent any sag, and as sheeting proceeds individual rails, being free at the top, can easily be brought into correct alignment if necessary.

Whichever practice is adopted it is essential to avoid any sag of the rails during erection, as this will result in slack material in the centre of the lift and lead to barrelling in the middle and trouble with the guiding mechanism when the holder is in service.

When the lift is completely assembled and tack-riveted or bolted in position, it is possible to check the shape before any final riveting is done, and if any faults are in evidence they can be rectified at this stage. Providing the rest blocks are level and the sheets are well propped out during riveting, a good shape should be maintained. It is perhaps advantageous to rivet the sheeting together first before riveting it to the rail plates—particularly where the pitch of the rails is small.

Although good results can be obtained by building the inner lift first on the rest blocks and then building the other lifts at the tank top level and lowering them in as riveting proceeds, it is more difficult to keep a check on lowered lifts. Any trouble which may be experienced during the erection of the top sections will probably be due to defects in the lower parts of the lift which will have already been finally riveted, and extensive work will then be involved in rectifying the matter. It is also more difficult to maintain a constant level when lowering the lifts in screws. A level base is essential for accurate construction.

Welded Holders and Steel Tanks

Welding is being increasingly adopted for gasholder work and has proved itself particularly suitable for repair work—this is very well illustrated in a little booklet by H. H. Hollis entitled 'Metal Surgery,' which contains numerous examples of welded repairs which have been carried out to holders both in service and out of commission.

Although the majority of new holders are still of riveted construction, welding is finding increasing favour and has been adopted on several large holders and steel tanks. In gasholder tank work it is standard practice to work to a joint efficiency of 85% for butt joints welded on both sides. This is in excess of the efficiency of riveted joints on all but the thickest plates and results in economy in material. Where riveted diamond butt straps with joint efficiencies in the region of 95% are employed, although the plates are thinner than those for a similar welded tank, the weight of the butt straps counteracts the saving in the side plates. For example, on one of our large riveted tanks 232 ft. 3 in. diameter by 40 ft. 9 in. deep, the bottom row of side plates was 4 ft. 6 in. deep and $1\frac{1}{16}$ in. thick and had 36 diamond butt joints with an efficiency of 93%. For a similar factor of safety with welded joints, the plates would have had to have been $1\frac{7}{8}$ in. thick which would have increased the weight of the ring of plates by approximately 11 tons. Each butt strap on the riveted tank, however, weighed approximately $9\frac{1}{2}$ cwt., and for 36 joints the total weight is approximately 17 tons. Thus, even though thicker plates would have been used for the welded tank, there would still have been an overall saving of 17−11=6 tons when compared with riveted design. In addition to

the saving in material in the side plates, further material is saved by dispensing with a bottom curb angle on welded tanks.

The design of the lifts is governed by practical considerations and it is not possible to effect any appreciable economies in material here by the use of welding. The degree of reduction of material on a welded holder and tank varies with size and proportions, but in general the saving in cost varies between 2½-5%. It is more difficult to maintain a good shape on welded holders, but these difficulties have been largely overcome in recent years.

The skill of individual welders varies considerably, and a number of the defects in welds cannot be determined by visual examination. Until the development of radio-active isotopes it was not practicable to carry out comprehensive tests of site welding—the normal X-ray apparatus is too cumbersome and expensive for use on gasholders and necessitates ideal conditions for successful radiography. It is now our normal practice to radiograph a proportion of all our site welding.

Maintenance of Klönne Holder

The first Klönne type gasholder was erected in Germany in 1927, and in 1931 the first one was built in this country at York. It is, however, in the steel industry that the Klönne has found greatest favour and it is now extensively used on blast furnace plant on account of its high performance when the piston is operating at speed; also, the gas is stored at constant pressure.

Although the Institution of Gas Engineers Gasholder Committee recommends that regular inspections of waterless gasholders be undertaken, this does not imply that a great deal of maintenance is required in the case of the Klönne holder. The introduction of the automatic lubrication system should reduce necessary maintenance to a minimum, and little work on the holder apart from the inspection should be necessary.

The inspections recommended include:—

(a) *Daily Record* of maximum and minimum temperatures and maximum and minimum stock.
(b) *Half-weekly* check of piston levels. Maximum tilt of piston not to exceed 1/1,000 of diameter between 8 a.m. and 9 a.m., and even in the heat of the day the tilt should not exceed 1/500 of the diameter.
(c) *Monthly*. Examinations of folding ladders, rollers, packing ring, electrical equipment (if any), lifts, windows, emergency winch and rope, inspection and test of breathing apparatus.

The following are advantages claimed for the Klönne holder:—

(1) Considerable saving in steel over a spiral holder and steel tank.
(2) Constant pressure.
(3) Dry gas can be stored.
(4) Saving in foundation costs, particularly on bad ground.
(5) Internal and external surfaces are readily accessible for examination and maintenance.
(6) High operating speeds do not affect the efficient working of the seal or lead to undue wear on the guiding mechanism. There are records of rates of piston travel up to 2 m. (or 6 ft. 6 in.) per min. without trouble being experienced.
(7) The piston can easily be loaded with concrete blocks to give added pressure. Normal working pressure is usually around 6 to 8 in., but can be increased up to 20 in. w.g.
(8) The lubricated friction seal eliminates the problem of tar emulsification and benzole absorption associated with gasholders using tar as a sealing medium.

Wiggins Holder

The Wiggins flexible seal principle was initially applied in 1936 to afford floating roofs for oil storage vessels. The first Wiggins holder used for the storage of gas was built in U.S.A. in 1940, the capacity being 50,000 cu.ft. Two further small Wiggins gasholders were built in America during the war, but it was not until the cessation of hostilities that this type of holder really began to develop. In the United States of America it is now beginning to displace water-sealed holders for new installations. By October, 1952, approximately 130 Wiggins gasholders had been erected or were on order. The largest contract so far obtained is for a holder of 1 mill. cu.ft.

In Britain the largest Wiggins gasholder so far erected is one with a capacity of 250,000 cu.ft., which was recently completed for the National Coal Board at Point of Ayr Colliery, North Wales.

There are no practical difficulties restricting the size of this type of holder. The Patentees, General American Transportation Corporation, have prepared designs of holders up to 6 mill. cu.ft.

The piston, flexible seal, lower section of the shell sides, and the holder bottom plates form the gas-tight portions. The piston is displaced according to the volume of gas contained.

Holders with a capacity under 20,000 cu.ft. have a single seal only which extends between the circumference of the piston to a position approximately one-third of the way up the shell sides. When the piston is on the rest blocks and gas first starts to enter the holder, the flexible seal assumes an upward looped position—the pressure necessary so to position the seal being approximately ¼ in. w.g. The pressure of the gas naturally tends to push the seal inwards over the piston, and to contain and support the seal the piston is provided with a fender to afford a backing or abutment surface. The fender is a braced structure to which are attached shaped sheets. The corrugations in the sheets assist in evening-out any possible irregularities in the seal.

As the piston rises, the seal, being under pressure, rolls off the fender on to the shell without any rubbing or friction. For holders with a capacity between 20,000 cu.ft. and 3 mill. cu.ft. the flexible seal is made in two sections.

Reduction of Maintenance

The operation of the larger holders fitted with a telescoping fender is similar in principle to the smaller ones, but in this case the section of the seal attached to the perimeter of the piston is secured to the bottom of the telescoping fender. When the piston is sufficiently inflated the piston fender contacts the outer or telescoping fender; this occurs at about one-third of full inflation.

The steel required for the Wiggins holder shows considerable saving over a similar capacity spiral and steel tank. As the capacities increase the saving in steel is considerable—*e.g.*, 8% on a 10,000 cu.ft. holder, 25% on a 1 mill. holder, and up to 40% on a 5 mill. holder.

In the absence of guide rollers and other moving parts, routine maintenance is reduced to the absolute minimum and there is no necessity to carry out any inspection above the normal yearly examination undertaken in accordance with the Factories Act.

The smooth exterior surfaces of the Wiggins and the fact that there are no wind and water lines or parts dipping in and out of the tank water, should considerably reduce routine painting costs.

The following general advantages are claimed:—

(1) No anti-freezer required—operation unaffected by climatic changes and severe weather.
(2) Reduced maintenance.
(3) Gas pressure constant within small limits. Difference between maximum and minimum pressure on the larger holders is in the region of ¼ in. to 1½ in. w.g.
(4) Its more æsthetic appearance and reduced height when compared with equivalent capacity water sealed holder and steel tank, should, in certain cases, assist in obtaining the sanction of the authorities when negotiating for permission to build on a new site.
(5) Steel required is less than for an equivalent capacity spiral and steel tank—particularly on the larger holders.
(6) Reduced foundation costs, particularly on poor ground.
(7) Dry gas can be stored.

These points make this type of holder exceedingly

suitable for use on the district, particularly when some system of remote control is incorporated.

Conclusions

Each of the four types of gasholder outlined has its own particular merits under certain conditions.

Water-sealed holders are extremeiy reliable and require fewer routine inspections and less maintenance than waterless types of holder. The multi-lift types, however, have the disadvantage of varying pressure, and it is frequently the case that the inner lifts throw insufficient pressure for distribution requirements and boosting is necessary. When these factors are not of great importance water-sealed holders will generally be preferred to other types.

The waterless type of gasholder has not found very great favour in the gas industry in this country, and the progress they were making was considerably retarded by the fact that they were nearly all compulsorily taken out of service in Britain during the war. It is interesting to note, however, that they proved as safe as any other types of holder in Germany under wartime conditions.

Of the two main types of waterless holder, the tar seal type has in the past found greatest favour in the gas industry, probably on account of its claim to a positive seal; but the Klönne packing ring has proved equally efficient under actual working conditions and the very high rates of piston travel on this type of holder are proof of the effectiveness of the sealing device.

The Klönne holder seal is, moreover, unaffected by benzole vapours, moisture content of the gas, or icing conditions, and requires less maintenance than the tar-seal types. In cases where constant pressure is required, particularly on the larger works, it is difficult to assess the reasons why this holder has not been more extensively adopted in the gas industry, particularly when bearing in mind that capital outlay on the Klönne above about 3 mill. cu.ft. is, if anything, slightly less than for an equivalent size spiral.

The Wiggins holder is a recent development as far as this country is concerned, but it is already apparent that it requires less maintenance than any of the other types. This fact, coupled with the high pressures which can easily be provided, the holder's pleasing appearance, and the absence of any necessity for anti-freezing equipment, makes it an ideal holder for the district.

It is evident that the conventional spiral is not the ideal holder for all conditions, and that in certain circumstances the newer types offer certain advantages which should not be overlooked when the installation of a new holder is under consideration.

DISCUSSION

Mr. Perks (Stockton-on-Tees) expressed his appreciation of the paper, and mentioned that one of their holders was built in 1875 by Ashmore, Benson, Pease & Co., and was still in good condition. He stated that he had often wondered why the Klonne dry gasholder had not been adopted more widely in this country by gas undertakings in view of its obvious advantages. He also referred to experiments that had been carried out at Stockton gasworks with the Wiggins seal material and unpurified carburetted water gas.

Mr. Walton, in reply, said that the Klonne seal is unaffected by moisture and benzole content of the gas which present problems in the case of tar sealed holders.

Mr. E. Aspinall (Robert Dempster & Sons, Ltd.) referred to the increasing use of radiography, and said that while there had been a certain amount of trouble in the early stages due to dilution of the tar seal on the M.A.N. holder, this had been largely overcome. He had two questions to ask regarding the Wiggins holder: Was there any trouble caused by condensation inside the holder, and what was the effect of ice forming on the seal? Also on large Wiggins holders was there any additional stabilising of the piston required to overcome the tendency to tilt?

Mr. Broadbent, in reply to these questions, said that experience on the Alston Wiggins holder had shown no sign of condensation above the piston. He referred to a visit in winter to this holder when he had found the gasworks foreman chipping ice out of the cup and tank of an adjoining water sealed holder while the Wiggins was quite unaffected. On the larger Wiggins holders an increased number of levelling weights was used. On a small holder only two sets of these weights were used, whereas on the 250,000 cu.ft. holder there were three sets of heavier weights. He mentioned the extreme steadiness and rigidity of the piston as experienced on these holders.

Mr. W. R. Garrett (Northern Gas Board) disagreed with the view that spiral guided holders were easier to maintain than column guided, probably due to inaccuracies in manufacture and on older holders carriages of insufficient strength. He also referred to the Ilkeston disaster in 1913 when it was stated at the enquiry that spiral holders should have vertical stiffeners on the tank sides from the tank balcony to ground level. He said that this enquiry might be quoted in the event of any similar incident on a holder without these stiffeners. He thought that phosphoric acid pickling of the sheets was much to be preferred to use of copper bearing steel. He also deprecated the method of making cold riveted joints in gasholder sheets with only a coat of paint. He said that all cold seams should be taped. He mentioned the specific case of a large holder crown which had been riveted without tape and leaked badly.

Mr. Walton, referring to the Ilkestone disaster, said he had always undersood that for some reason the holder bell had tilted, thus throwing a terrific load on one point on the tank which had split from top to bottom; also the tank was designed with a factor of safety of less than four even when only taking water pressure into account. This surely did not mean that had tank stiffeners been used the holder would not have split. He contended that provided the brackets under the carriages were extended down, say, three tiers of tank side plates this would effectively stiffen the weaker portion of the tank and transmit the loads from the carriages to the heavier plates where the stress is dissipated.

Mr. Broadbent referred particularly to copper bearing sheets, and gave the instance of a holder at Bridlington built by his firm in 1938. This was of copper bearing steel, and the sheets had been allowed to weather before painting. This holder is in marvellous condition without any signs of corrosion, but this condition has probably been helped by regular painting. He had been informed that copper bearing sheets rusted as quickly as ordinary mild steel sheets when left to weather. Referring to the use of tape, he said that one gas board insisted on no tape in cold riveted seams, which was directly opposed to Mr. Garrett's contention. Ashmore, Benson, Pease & Co. had built one holder in Canada about 1926 without any tape at all, and no complaints had ever been received regarding leakage.

Dr. Milner (Power Gas Corporation) referred to the experiments with Wiggins gasholder seal material at Stockton gasworks. These were carried out to develop an improved seal for use with unpurified carburetted water gas.

Mr. Garrett proposed a vote of thanks to the writers of the paper and expressed his appreciation of its contents and its value to gas engineers generally.

HIGH-PRESSURE STORAGE

In the course of a paper presented on November 24 during the Conference on Welded Structures held at the Institution of Civil Engineers, London, Mr. M. Noone, M.I.MECH. E., said that the high-pressure gasholder can show savings in transition from riveted to butt welded design. He referred to Publication No. 314/135 of the Institution of Gas Engineers, in which A. G. Grant and himself, discussing the design of high pressure gasholders gave comparative figures for high-pressure gasholders when riveted and welded. In one example it was possible to compare two holders of identical size and duty, each 25 ft. diameter by 200 ft. long, design pressure 81.5 lb. per sq. in. built to withstand a hydraulic test. The total weight of the welded holder, including the travelling ladder and supports, was 406 tons against a total weight of the riveted holder including travelling ladder and supports of 420 tons—a saving of 3.3%.

The riveted holder was designed to B.S. 429:1931, and the welded holder to the A.O.T.C. code for fusion welded unfired pressure vessels with a joint factor (efficiency) of 72%. The vessel was not subjected to X-ray inspection or to heat treatment for stress relief but full mechanical tests on weld coupons were carried out.

It cannot be too strongly emphasised that welding quality can only be achieved by objective inspection. In the author's opinion the best inspection at present is by radiography, preferably 100% of a welder's work with a minimum of 5%. In the absence of objective proof of good welding quality the designer takes a grave and culpable risk on the welded seams.

MEASURING INSTRUMENTS

FROM A PAPER TO THE EASTERN JUNIOR GAS ASSOCIATION BY

C. E. HAMMOND,

Technical Advisor, Walker, Crosweller & Co., Ltd.

THERE is no doubt that the gas industry presents special problems in the matter of satisfactory instrumentation, due to the nature of the gas being measured and the conditions under which the instruments have to work—conditions which vary from the heat and dirt of a retort house to the cold damp inhospitable district governor kiosk, from the measurement of pulsating pressure in the exhauster house to the volume of that trickle of gas which passes along a district main during the night.

In the initial choice of the type of instrument, and the way in which it is applied, connected, and maintained, depends the success or failure of each individual installation. These points are not laid down in order of importance. However good the instrument, the results will be dismally disappointing if the application and connection are poorly executed. As far as maintenance goes, correct installation will reduce this to the minimum.

Where Measurement is Required

There is no simple answer to the question of where measurement is required, two of the big influences being the attitude of mind of the engineer concerned and the initial cost compared with the value of the result, measured either psychologically or financially. Measurement may be needed for some of the following reasons:

(a) To show the value of a manually set condition—*e.g.*, CO, pressure, or bulk supply gas into holder.
(b) To show the consistency and value of an automatically controlled condition—*e.g.*, inlet retort house governor or outlet volumetric governor.
(c) To safeguard the plant from dangerous maximum or minimum conditions—*e.g.*, inlet and outlet exhausters, purifier temperatures.
(d) To adjust ratios of gas volumes—*e.g.*, air to purifiers.
(e) To serve as a 'policeman' over routine manual operations—*e.g.*, CO flues, manual C.W.G. plants
(f) To provide statistical information for planning—*e.g.*, throughput of compressors and boosters.

Some of the above reasons make certain measurements essential, whatever the size of the works; others may be ignored if measurement cannot be calculated to achieve a financial saving equal to, say, a fifth of the instrument cost per annum. Some illustrations as to how this cost can be calculated were given last year by Mr. J. Newman, of Pontypool, in his paper to the Wales and Monmouthshire Junior Association ('GAS JOURNAL,' August 13, 1952, p. 359). To quote an example from his paper, 1% of CO in the waste gas flue can cost £33 10s. per 1,000 tons of coal carbonised per annum. The use of CO pressure and waste gas flue recorders can make this wastage less likely to occur.

The psychological effect upon operatives, difficult to assess, must not be ignored. Often enough when an instrument is fitted to find out just what we suspect is happening in the night, it suddenly ceases to happen! The value will only be shown in next year's returns.

Type of Instrument to be Used

First it must be decided whether to indicate or to record the measured value. In general any critical measurement of a manually or automatically controlled condition should be recorded, but those less critical points and those which are under constant surveillance by responsible personnel need only be indicated. In a large works with shift engineers indicators may serve a large number of points, but in the smaller works, with very few staff, recorders are invaluable.

Having decided upon an indicator or recorder, the actual design of the instrument must be studied to be sure that it is suitable for the application—having in mind that unreliability and false readings can be worse than nothing at all. The points to look for are as follows:

(a) The case should be dust-tight and, for district use, substantially water-tight.
(b) The chart or dial should be easily read by operators.
(c) Charts should have an overall time scale which makes it possible to fix the correct time of occurrences.
(d) The range is such that possible, but improbable, maxima and minima are accommodated.
(e) The principle of operation is such that the instrument is not put out of action by normally dirty conditions or frost.
(f) The parts are fabricated from material which will withstand sulphur, ammonia, and cyanogen compounds.

The precise nature of the principle of operation such as a bourdon tube, bellows, slack diaphragm, spring controlled bell, displacer float, or ring balance needs studying in relation to the nature of the job and the range required. In general it is fair to state that the less complicated the mechanism the longer will it retain its accuracy and the easier will it be to maintain within the gasworks boundary. The initial cost varies with the design and construction.

Installation and Connection

It is in this field that the money spent on an expensive instrument can either be thrown away or made to pay dividends. As mentioned earlier the carbonising industry presents problems rarely met in other fields. These problems have been examined, and after a series of experiments it has been possible to determine the most practical way of overcoming them.

Gas engineers were among the first to use instruments in this country, but often show scant respect for them. The manufacturer who makes instruments for this industry can only envy his colleague who supplies to power stations. However, with a little ingenuity on his part, and care on the industry's part, there is no reason why equally satisfactory results should not be obtained, particularly now that it is recognised that a certain amount of specialist treatment is called for.

The aim of the application and connection should be so to safeguard the instrument that it will always provide true measurement and not break down due to stoppage in the impulse pipe. The best place is adjacent to the point of control, and if this is such that it is subject to considerable dirt or weather, some protection in the form of a glazed cupboard should be provided. Atmospheric temperature may be high without affecting the instrument but care should be taken to prevent radiated heat from hot ironwork raising the case temperature, as this will increase the rate of corrosion and may do damage to clocks.

Complete panels should be sited where there is plenty of room both at front and rear, good lighting, and a foundation free from vibration. When designing the plant and house the question of control must be taken into consideration and provision made for fitting an instrument panel. If it is not desired to have a panel occupying room space it may be built into a wall, with access to connections and a pipe trench in an annexe to the main building. Non-flameproof instruments may be housed in an annexe and viewed through a plate glass window, but if this is not possible the requirements can be satisfied by purging instrument cases and panel with fresh air.

Ease of access cannot be too highly stressed. A firm's service engineer or the works technical assistant cannot give his best attention to maintenance if he is working in a dangerous place and having to perform some physical contortions to get at the job, apart from the fact that operators may not pay the necessary attention to the instrument readings.

Having fixed a suitable site for the instrument or panel it is necessary to consider the question of the impulse

pipe and its connection into the main or flue. This is particularly important in the case of retort or exhauster houses where corrosion and blockage risks are highest. The following 'tricks of the trade' may be helpful in rectifying existing unsatisfactory installations or making new ones.

Impulse Pipes

Foul main connections should be made at the top, with a 1-in. tapping which should lead straight into a short length of 3-in. pipe, vertically disposed. The connection from the top of the 3-in. pipe to the instrument should be of a size governed by the length, ½ in. being the minimum for short runs, as it has been found that small pipes not only block up quickly but impede the response of instruments. Regardless of the appearance, the impulse pipes should have steep falls and frequent supports to prevent sagging. The connection into any instrument should be made from *below*—and, if it is below the measurement point, a sizeable drain should be fitted to accommodate condensate in the impulse pipe. A bubbler should be installed, whereby a bleed of clean gas or air can be allowed to pass back to the main. The length of 3-in. pipe then acts as a reservoir to cope with surges. Ready-made bubblers are obtainable with a needle valve incorporated so as to adjust the rate of purge gas input. A small flow of purge gas along the impulse pipe does not affect the accuracy of the readings and it does keep dirty gas away from the instrument and tar or salts out of the impulse pipe, and so ensures a long trouble-free working life.

Connections to flues should incorporate the length of vertical 3-in. pipe, which then acts as a dust trap, but do not need bubblers.

When vacuum is being measured a cock is necessary on the measurement point side of any drains; otherwise it will be found impossible to drain off all condensate. This provision applies particularly to differential pressure measurement where a small column of liquid in one impulse pipe can play havoc with the readings shown by the instrument.

Instruments elsewhere on the works and district should always have impulse pipes larger than really appear necessary and sharp falls to avoid condensation. Naphthalene and dust have an unfortunate habit of blocking a small impulse pipe in the worst of weather and just where the pipe goes under a newly reinstated part of the yard. Pipes passing through any ground suspect of corrosive nature or subject to electrolytic action should be protected with a proprietary plastic wrapping.

These remarks apply equally to impulse pipes to water gauges as well as recorders and indicators. It is true that gas is not actually consumed by the instruments, but it is always travelling back and forth due to pressure variations, diffusion, and temperature changes.

One further point on this subject is that tappings should be made into straight runs of main, never on to bends or tees. The author well remembers a case where the inlet and outlet water gauges to a condenser actually showed a higher vacuum on the inlet side. This was traced to the curious coincidence of the tappings on to bends, one at a point of higher pressure and the other on the inside of a bend in a vacuum pocket—but not until the instruments had been under suspicion and proved not guilty.

Maintenance

The foregoing remarks on installation have been made with one aim in view—to reduce the necessity for instrument and impulse pipe maintenance. However, a certain amount of work must still be done, such as chart changing, pen filling, and clockwinding. These activities are best carried out by someone who is able to interpret the results from the charts and take an intelligent interest in the procedure. Less frequent duties relate to zero checking, integrator setting, head checking, and periodic cleaning and oiling. Regular attention of this sort reduces the risk of the necessity for emergency attendance after something has gone wrong.

The majority of manufacturers are pleased to assist in the matter of specialist training, and on a larger undertaking it is well worth while to have a suitably trained specialist because he will spot any troubles before they develop into expensive repairs.

Inferential Measurement

This paper would not be complete without some reference to the applications of inferential measurement to industry, measurement which has nowadays come to be regarded as commonplace for applications not covered by the Gas Act.

Inferential instruments record or indicate the rate of flow by inferring its value from a measured differential pressure created by an orifice plate, venturi, or pitot tube. To ensure that the instrument continues to give and receive the correct information the previous remarks on impulse pipes and maintenance apply, but the question of where to put the differential pressure device, and what type to use, requires special treatment.

The orifice plate is the cheapest and easiest to install, and in most circumstances provides accurate results. The plate is made from ⅛-in. or ¼-in. material and gripped within the bolt circle of a flanged joint. It is preferable to make a flexible joint by one of these flanges, so as to allow for easy removal of the plate should it become necessary to install a new one to change the instrument range. Tappings are made at one diameter before and half-a-diameter after the plate.

To measure accurately, orifice plates must be installed in straight mains, the length of straight necessary being dependent on the form of flow disturbance—for example, 12 diameters are usually sufficient after a bend, whereas 30 diameters are necessary after a regulating valve. Six diameters after the plate are sufficient. Details of requirements are laid down in British Standard Code of Practice No. 1042.

Mains must be adequately drained to avoid the build-up of liquid to orifice sill level. If new mains are going in, it is a good plan to fall the main away from both sides of the plate. The orifice plate should be accessible and surrounded with a pit if underground. There is no objection to its installation in vertical mains.

Where mains are short or velocities high it may be necessary to use a venturi made from steel or cast iron, but this is expensive and not generally resorted to. The pressure drop across a venturi is lower than across an orifice and it has the capacity of ironing-out flow disturbances by centralizing them.

Pitot Tubes

Pitot tubes should be used only where it is not practical to break into the main to install an orifice, or where velocities are high and pressure loss cannot be tolerated. Pitots are not generally satisfactory on the works side of the holder, because velocities are low and the resulting differential is too low to be measured accurately by a commercial instrument. In addition the pitot is highly sensitive to turbulent flow, encrustation on the main walls, and pulsations, making results unreliable. As a means of obtaining a measure of peak load or normal output through an outlet holder main (where velocities are usually high) it can be regarded as a reasonably satisfactory solution provided that a recorder or indicator can be obtained to operate under a low differential head. Results are not sufficiently reliable, being in the order of ±10%, to be used for statistical or inter-works charging purposes. It has been found that for general purposes the standard type of N.P.L. tube is unsatisfactory; and special tubes have been developed for industrial use, the coefficients being determined by experiment. These tubes develop a higher differential and are designed so that they do not fail due to condensate or naphthalene stoppage.

There are certain points which can be given as guide as to where to measure on the works, so as to avoid positions subject to big temperature or pressure variations such as: At outlet purifiers rather than inlet, at inlet compressors rather than outlet, between the air blower outlet control valve and the non-return valve rather than directly on the inlet purifiers. Orifice plates used to operate volumetric governors may also be employed for measurement, provided the orifice location is specially

(*Continued on p. 611*)

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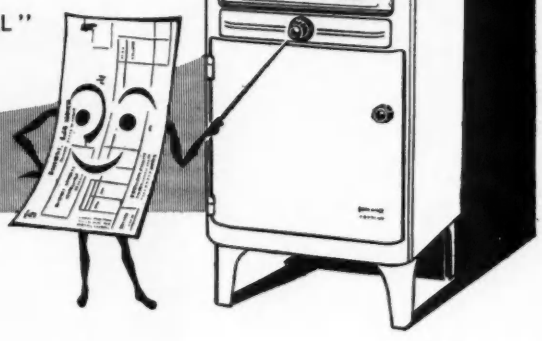

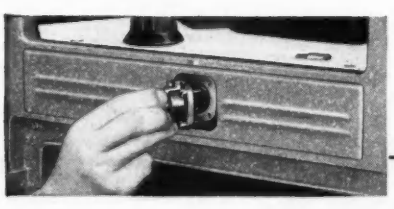

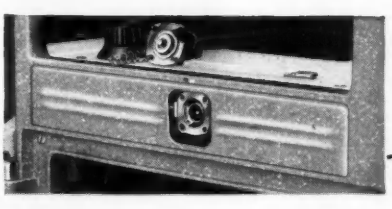

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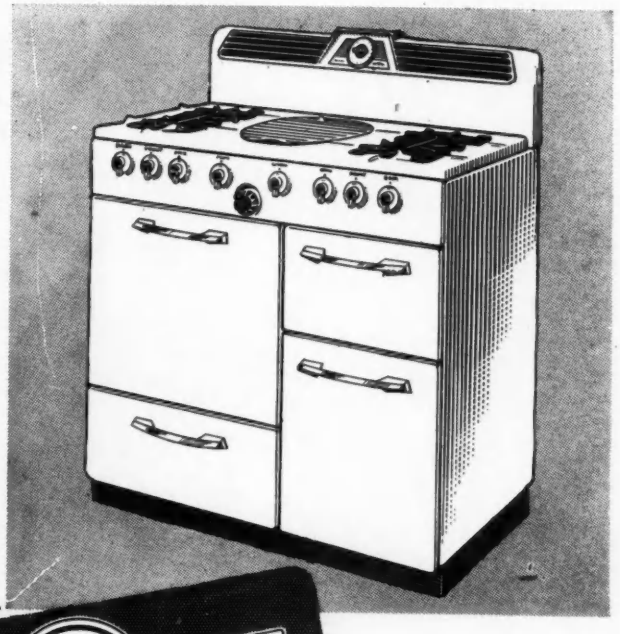

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chosen to comply with the measurement requirements as opposed to the more elastic requirements of the governor.

These recommendations regarding positions are made so as to avoid complications due to the variables in temperature and pressure. Each application has to be decided on its own merits as regards accuracy requirements, and the purpose of the meter. If the ideal position cannot be achieved, and the differential pressure device has to be installed where there are wide variations in pressure, recorders should be fitted to show the variable pressure. It may be necessary to make corrections to the chart for each pressure period. Where the variation is in the order of pounds this procedure is essential. Specific gravity variations due to C.W.G. admixture need to be taken into account if final accuracy is called for.

Where volumes vary over a wide range a mechanical integrator can be fitted so as to give a reading of total flow. These usually operate by taking regular spot readings of flow and summating on an elementary adding machine. Integrators are not necessary on the majority of works applications. They cannot be relied on if the main is subject to wide variations in pressure.

Periodic checking of rate of flow recorders is in addition to normal maintenance. This routine consists of checking the meter response to differential head and ensuring that the integrator agrees substantially with an estimated or plain metered total taken from the coincident chart. In this connection it should be remembered that integrators establish the total from the recorded or indicated rate and are not a separate means of measurement.

With the higher efficiencies called for in the works and the complexity of modern distribution schemes, engineers are having to place increasing reliance on instrumentation. To get the best out of instruments emphasis has purposely been laid on installation, and some guide has been given regarding the conditions which determine where they should be used. Reference to too many specific application points has purposely been omitted as these depend largely upon individual works and system requirements. Over-elaboration should certainly be avoided, as an operator faced with a conglomeration of unnecessary data tends to overlook the really vital information. Quality and reliability should take precedence over quantity.

FAITH IN THE INDUSTRY

MR. H. F. H. JONES SPEAKS TO LONDON JUNIORS

THE Deputy Chairman of the Gas Council, Mr. H. F. H. Jones, M.B.E., said in London on November 20 that he wondered sometimes whether the younger generation had a similar faith to those who had worked for a good many years in the industry. He was addressing a meeting of the London and Southern Junior Gas Association at the Edgware Road offices of the North Thames Gas Board.

'I know that those of us who have worked for a good many years in our industry have a deep-seated faith in its future, and a conviction of its continued success,' he said. 'I wonder sometimes whether the younger generation have a similar faith. The question which I think we must answer is: "Does the gas industry offer an essential service, and are there merits in gas which other fuels have not got?"'

Gas had two intrinsic advantages which should not be lost sight of, although they were so obvious that they were occasionally taken for granted. The first was that heat could be released very rapidly in a small space by the use of simple equipment, and the second that heat could be released at a high rate or a low rate or any other rate under the most precise control and with unequalled flexibility. There were, of course, ancillary advantages such as cleanliness, absence of any need for storage on consumers' premises, possibility of maintaining a controlled atmosphere in furnaces, and so on, but Mr. Jones added, 'whether the operation involving the use of gas is the boiling of a kettle on a gas ring or the treatment of a metal under some very precise temperature regime, the basic properties of rapid heat release, and flexibility in operation, are those which give gas its advantage over all other fuels and sources of energy.'

With those technical advantages, it was their duty to make the service which gas could offer available at the lowest cost at which good service could be given and sound financial policy pursued. This meant that the cost of gas production had to be kept down by efficient operation of the gasworks. The service given to the consumer had to be based on an efficient organisation with modern technical equipment, and properly trained staff. It was also necessary that the figures of working costs should be so presented to those who formulated Board policy, that the price of the service offered to consumers could be reasonably well related to the cost of giving it. In this way, the full competitive power of gas could be brought to bear upon the market.

Mr. Jones denied that the gas industry was a monopoly. 'Domestic, commercial, and industrial consumers can all turn to competitive fuels if the service given by gas is not sufficiently good,' he said. Its operation was not that of an ordinary commercial business, however. The industry had to be run in a business like, enterprising, and economical way so as to give good service at the lowest practicable cost, and also it had to fulfil the duties laid upon it under the Gas Act.

The present organisation of the gas industry was different from that existing before nationalisation in a number of ways. Most important was that the scale of organisation was so much larger. Again, the Area Boards were responsible to Parliament through the Minister. Previously this was not so, but for much longer than any of them could remember, gas undertakings, except the very small ones, had been subject to statutory control. 'Another difference lies in the method of raising capital,' went on Mr. Jones, 'but I do not remember that the raising of capital monies was ever a source of serious embarrassment to the larger gas undertakings.'

Although before the war there had been a long tradition of amalgamation in the industry, the building up of a large undertaking, except in places such as London and Birmingham, could take many years. Often progress was delayed, or halted, by a board of directors or a committee of a municipality which, perhaps for reasons which seemed excellent, refused to join with neighbouring undertakings, thus possibly stultifying the efforts of other boards of directors, or municipalities, to merge their undertakings for the common good.

Mr. Jones continued that because the machinery for authorising amalgamation by statute was somewhat costly, and, if opposition arose, could impose much delay, gas holding companies began to operate by getting control of the share capital of gas companies in neighbouring localities, so enabling groups, which permitted of larger scale organisation, to be formed in various parts of the country. But here too, good schemes could be spoiled by 'the odd man out.' 'Now that we have only 12 boards in place of about 1,000 undertakings, technical planning of works and mains can take place on a much larger scale than was previously possible for any but The Gas Light and Coke Company,' continued Mr. Jones. 'The advantages of this, from the point of view of thermal efficiency and economy of capital, can be seen in the Boards' reports.'

Wider Field Available

For example, the South Eastern Gas Board proposed to link Sydenham and Croydon gasworks and Worcester Park gasholder station. The planning of works construction, and the making of the most economic arrangements for gas and coke production could be done over a much wider field than was possible only five years ago.

'I would not like to give the impression that the standards of efficiency of gas production and of service to the consumer are automatically improved by larger scale working. I know that the best standards of pre-vesting working were very good indeed; but in many places these standards were not achieved.'

Mr. Jones spoke of the raising of capital monies by the Gas Council by the issue of Gas Stock, and the subsequent allocation of money to the area boards after the Minister's approval. The Gas Council also had to advise the Minister on the plans for capital development submitted to him by the Boards. In the past, Mr. Jones said, he had known a number of gas undertakings which sold gas at unduly high prices solely because of imprudent outlay of capital at some past time. Some people may have thought that as long as expenditure was charged to capital account it did not affect revenue

costs. 'Nothing could be more misleading. The consumer pays in the end. He pays for revenue expenditure at once, and for capital expenditure over a period of years, but under the Gas Act, and the operation of the normal depreciation and redemption provisions, he pays in full, and may be, if taxation enters into the calculation, he pays more than once.'

Research Now and Then

Mr. Jones gave the main differences between research now and research five years ago. He said the scale of research had been increased and more effort was being applied, more especially to complete gasification processes, but also to effluent disposal, the gasification of residual fuel oil, and many other subjects.

The chief reason for pursuing with vigour processes for the complete gasification of coal was the high cost of carbonisation of coal. They were told that carbonisation coals would become more scarce and more expensive. The processes now under development were designed to use non-caking, or weakly caking, coals of high ash content which were cheaper and available in larger quantities than were the recognised carbonisation coals.

Mr. Jones' personal opinion was that working under pressure, once the technique had been mastered, would probably be found to have more advantages than drawbacks, and, as for oxygen, it could already be separated from air quite cheaply in large quantities, and of reasonable purity, and the limit had probably not been reached. 'I sometimes think that if our survival as a race depended upon obtaining all our drinking water from the sea, we would by now have found a cheap way of separating water of sufficient purity from the ocean. Similarly, I think that if the demand for cheap oxygen is sufficiently insistent we shall develop ways of separating it from the atmosphere at no great cost.' The dominating factors were compressor efficiency, efficient heat exchange, and good thermal insulation of the plant.

High pressures for gas manufacture might lead to high pressure gas transmission, and power recovery at the 'receiving end' from the pressure drop available. He had seen a welded steel main in France not very long ago. It had been tested at 60 atmospheres for use at 40 atmospheres. At present it was carrying gas at three atmospheres only, but if it was used at the designed pressure, its 20 mile length would contain nearly a day's supply of gas for the town which it fed. At present such transmission pressures were of academic interest only in this country, but the time might well come when they would have to consider them quite seriously and that would mean some engineers would have to learn new techniques.

One of the contingencies which might have made the distribution of gas at high pressures a matter of urgency would be the discovery of useful quantities of natural gas. The search for natural gas, which had been instituted by the Gas Council, could not, in Mr. Jones' opinion, have been carried out by the gas industry when it consisted of a large number of independent undertakings. It would have been difficult to find the money and there might have been no assurance of a market.

Mr. Jones turned to the consideration of the point of view of the individual working in an industry. A large organisation could be considered to have either drawbacks or advantages, depending upon the individual's point of view. 'In a small organisation a number of people have considerable degree of authority and can decide the way in which their duties shall be carried out,' he said. 'If they are part of a large organisation they should, if the organisation is decentralised, retain a degree of authority, but the methods by which their work is to be done are decided for them to a considerable extent so that the working of their unit can be co-ordinated with that of all the others in the organisation.' Every one would certainly have to learn to work with other people to a greater extent than in a small independent unit.

Education and Training

After describing the greater opportunities for promotion in a large organisation, if the opportunities offered were taken advantage of, Mr. Jones discussed the subject of education and training.

In the last report of the Gas Council it was stated that almost 9,500 employees of the Area Boards and of the Council were following last year some set course of study within the general programme of training which had been adopted for the training of employees. It could be said that the industry now offered a broader avenue for promotion than ever before, and at the same time helped employees, through the education schemes, to fit themselves for promotion if they had the wish and the ability.

Mr. Jones said it was appropriate at that moment for him to say something about the treatment of younger people. 'The quality of a nation is determined by the quality of its citizens; and the most valuable asset which our country has for its success in future years is the rising generation.' He added that the prominence given to statistics of juvenile crime was like the froth on a tankard of beer. It concealed a great quantity of good material underneath. 'I believe that the present day crop of young people is as good as this country has ever had. Nevertheless, those of us who have had experience of dealing with young things, whether human, animal, or vegetable, know that in their early days they can easily be stunted and their full development frustrated.'

When young people entered industry, many of them were full of the enthusiasm and the high ideals of youth and because some of them might not have high standards and might not have keenness or the desire to work, was not a good reason for any lack of encouragement or sympathy from older people towards new entrants. It was their duty to the industry, and, indeed, to the country, once they had reached the 'years of discretion,' to give what help and encouragement they could to the young people who entered their industry and to whom the industry must look for its future success and prosperity.

Mr. Jones said it would be wrong to suppose that all the benefits of large-scale working or of what might be called mutual aid had arisen since vesting date. The Industrial Gas Development Committee of the Gas Council had done and was doing excellent work in the direct line of descent from its predecessor in the British Gas Council. For many years, thanks to the efforts of such men as William Dietrichs, industrial gas consumers had had the advantage of advice through the various gas undertakings which themselves had co-ordinated their work in the development of industrial gas sales through the industrial gas development centres. He went on: 'My personal view is that sales of gas to industry will continue to develop provided the cost of gas production can be kept at a competitive level provided good service continues to be given by the Area Boards to consumers of gas for industrial purposes.

'If one has regard to the increased productivity which is so necessary in our factories and if one remembers the urge towards higher and higher output from every employee in the factories, then I feel sure that gas, a clean and uniquely controllable fuel, must be in greater and greater demand.'

Opportunities

Mr. Jones referred to the White Paper about rented houses (Cmd. 8996) which, together with a pamphet entitled 'operation rescue,' laid great emphasis on the importance of raising the standard of a great number of dwellings which were structurally sound, but lacked modern amenities, such as hot water supplies. Much reconstruction and improvement was envisaged, which was bound to require the provision of proper hot water services in a great many dwellings, and much modern space heating equipment. 'Here we have two obvious markets for gas and coke with the possible opportunity of getting other gas equipment, such as washing machines and refrigerators, installed as well.'

On 'smog,' Mr. Jones said it was ironical that with important bodies urging the Government to increase smokeless fuel availability members of the public did not know that they could buy supplies of smokeless fuel in practically all parts of the country. The proportion of householders who took their permitted quantity of coke was quite small. 'The opportunity which the gas industry has presented to it here, of meeting a public demand with a consequent improvement in thermal efficiency and economy in the overall use of coal and a cleaner atmosphere, will only be taken if at our gas works we offer a good quality of coke, and if our salesmen remember that the more coke they sell, the easier it is for the gas works to produce gas at competitive prices.'

Concluding, Mr. Jones said the way ahead might not be easy. Competition might be keen, but 'let us remember the basic virtues of gas and coke which I have already described, and bear in mind that our predecessors, and in my case, and that of others, our forbears, had their troubles, when electric light was first invented, and later when oil became cheap, and the use of electricity in the home was extended. So far the industry has met all comers with success. Providing that all of us play our part in giving the homes and industries of the nation the service they need, I am confident that it will continue to do so.'

ACCORDING to a meeting called by the Industrial Association of Wales and Monmouthshire 'to decide what action industry could take to safeguard the future welfare of students and potential technicians and executives,' a lack of co-operation among educational authorities is retarding the development of facilities for technical instruction in North Wales colleges.

FUNCTIONAL AGENT OF MANAGEMENT

FROM A PAPER TO THE WALES AND MONMOUTHSHIRE JUNIORS, OCTOBER 31, BY

GWILYM A. EDWARDS,
A.I.M.T.A., Internal Auditor, Wales Gas Board.

I HAVE been unable to discover any defined status for a group accountant of a gas board. Duties of chairmen, conveners, and managers have been laid down; but the functions of the accountant, more by inference than rule, appear to me to be threefold:—

(i) He is responsible, subject to the chief accountant's directions, for the keeping and recording of appropriate records.
(ii) He is to assist and advise the managers in his particular group on their financial records.
(iii) He is a member of the group committee which has among other duties that of supervision of the financial affairs of the group.

There is thus at the operational level, in view of the full responsibility laid on the local manager for the operation of his undertaking, a detachment of accountancy from financial control. The accountant becomes in such circumstances the functional agent of the management. He keeps records in some cases, in others merely advises on what records should be kept, which advice may be ignored; he collates the individual accounts and returns to group summaries; and to some extent advises directly or through the group committee the individual undertaking manager on financial matters affecting him. While the desire to avoid excessive centralisation and encourage the manager to accept responsibility for his undertaking is praiseworthy, the traditional canons of financial prudence are abrogated when the technical expert is also the financial controller.

Individual managers no doubt react differently to the onus placed upon them, but the endeavour of each one is obviously to improve his undertaking without sufficient regard for economic and financial implications. From my experience in local authorities, as in the Board, the technical man wishes to get the best results he can in the circumstances in which he operates, and if a more grandiose scheme, perhaps with a few embellishments, can be introduced, and the financial control can be circumvented or even flouted, efforts will be made to carry it through. This obviously is going to be fostered where the financial control is personal or lax. And a man who has spent the greater part of his years manufacturing and distributing cannot, with due respect to his latent abilities, blossom forth overnight as a financier.

This problem is, of course, peculiar to this area in view of the numerous small undertakings. In more populous areas serving a concentration of consumers the general manager principle has evolved. The possibility of functionalising then becomes more practical and the administrator, production engineer, and distribution engineer, in company with the accountant, fit into defined channels of duties.

Budgetary System

How can the present duties and responsibilities of the local manager be reconciled with greater financial control? The way would appear to be through a process of budgetary control. In December, just when the half-year accounts have been completed, a request comes from Headquarters for estimates. They require particulars for each undertaking of what the manager considers he will spend in the following financial year. In consultation with the group accountant detailed expenditure is anticipated to the best of the officials' knowledge and perception.

To implement a budgetary control the estimates prepared by the local manager would be considered by group committee and, subject to approval, forwarded to Headquarters. Expenditure during the relevant period would then have to be allocated by the manager against an approved item in the estimates, and any item submitted for payment and not approved in the budget would have to be referred to committee by accountant. During the financial year, returns, say quarterly, would be prepared by the accountant for the information of the committee, showing how the continuous expenditure compared with the approved estimates.

Expenditure checking would commence with the order made out by the manager, stating commodity, quantity, price (list, quotation, or contract), a copy being sent to the accountant. On receipt of goods or completion of work the invoice is certified by the manager and the allocation entered; it is then forwarded to the accounting office where details supplied are checked against order, the allocation is verified, and the invoices are scheduled into a payments list for authorisation by the group committee. A peculiarity in the board's control of expenditure perhaps more apparent to the ex-local authority staffs is the absence of financial regulations as embodied in Standing Orders, the existence of which materially helps correct and orderly procedure.

Capital expenditure by the undertaking is earmarked against the approval by the board relating to the particular scheme, and a monthly progress statement for each scheme is normally prepared for the information of the committee. This expenditure does not, of course, appear as a direct charge against revenue account in the year incurred but is spread over the estimated life of the asset, the first proportional charge for depreciation entering into the revenue account in the year following that in which the cost was incurred. When 75% of the total approved cost of a capital scheme is expended the committee is expected to ascertain any overspending anticipated and submit details for a further approval by the Board.

Stores Control

Mainly due to the persistence and persuasion of the accountant, systems of stores control have been introduced in all undertakings. Control over stores has been instilled, in which much prejudice has been dispelled by tact and co-operation. Most managers, when the system has been in operation, have been satisfied that it has given them closer control over stocks, ready ascertainment of stores on hand, more economy in purchases, and the correct allocation and tracing of issues.

Let us consider the accounting for the revenue of undertakings. Foremost is the income from sales of gas which may be in bulk between undertakings, and on credit or by prepayment to consumers. Bulk sales are increasing due to integration. They are based on a recommended formula aiming as far as possible at a fair cost of production.

Prepayment sales, which constitute a large proportion of sales in this area, are now recorded almost fully at the time of collection. Office work is mainly checking, summarising, and supervision. The problem of arrears of instalments has assumed large proportions on hire purchase agreements, and it is difficult to find a remedy at this stage. It was mainly due to the exuberance with which managers and sales staff encouraged sales in the immediate post-vesting period when money was more available than it is nowadays. We have instances of £30 cookers being installed three years ago on payment of a deposit of, say, 30s., and little or nothing has been paid since. Conditions in the household have changed. The manager has a stiff problem to face. His recourse to the terms of the agreement may leave him with an indifferently-used cooker on hand and a consumer lost to a competitive fuel.

Revenues must be sufficient to meet revenue expenditure taking one year with another. This infers that over a period any gas board must pay its way. It has sometimes been said that gas boards cannot make a profit. This

(*Continued on p. 616*)

a good looker...

and a fine cooker

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is not true. The Nationalisation Act requires income to be not less than expenditure. There is statutory obligation to establish and maintain reserve funds. Anyone studying the finance portions of the Act has no doubt been intrigued by the phrase 'taking one year with another.' As far as I know the position has not been judicially defined. It may be fair to suggest, however, that financial stability is to be assessed on a reasonably forward basis. If, for example, a board suffered losses for a few years during a period of inflation and could show that these losses were due to the inevitable delay in adjusting tariffs to meet unforeseen increases in working costs, this would be an answer to the question of whether statutory conditions had been fulfilled.

Annual Accounts

Apart from a three-part revenue account, net revenue account, and balance-sheet, schedules are given covering an analysis of gas sales, disposal of by-products, rendering and collection of accounts, and pre-vesting and post-vesting capital expenditure and depreciation and disposals. After the completion of the accounts the accountant submits the results to his committee and each manager is either gladdened or saddened by the one figure in what is to him a maze of figures—surplus or deficit for the year. Experience of the past years of board management has been that certain undertakings can be expected to make a profit while others, mainly the smaller units, can be expected to suffer a loss. Having regard to the requirements of the statute for the provision of a service, those making losses are quite likely those that require investment by the board to increase the service to the consumer. On strictly accounting lines the bolstering of units has only added to the already appreciable deficit. The strict sense of a profit or loss as shown by a set of final accounts cannot therefore be accepted carte blanche as a yardstick for the efficiency of the service provided. Financial accounting is a means of displaying the profit or loss on an enterprise during any period in a single figure representing the difference between income and expenditure. The traditional method of analysing expenditure for the purpose of financial accounts is subjective. The effect of the new objective analysis is to bring together the costs, for example, of carbonising, repairs to plant, and so on; and secondly, the cost into holder, cost of gas distributed, and total cost of gas. By the addition of unit costing these costs are converted to a pence per therm basis which again facilitates comparisons and control. Cost ascertainment is the important initial step and is the essential basis for any further development of costing technique. Where the technical man can effectively collaborate with the accountant in the control of costs, locate and eliminate waste and efficiency, and plan future activities on a sound basis of recorded past transactions, is by providing accurate data from source for the accountant to work on for costing purposes. Among the underlying objects of costing are the maintenance of efficiency in production and the control of waste—and waste is an insidious malady with cumulative effects.

With accurate figures at disposal comparisons can be made between different undertakings; the problem of choice of one type of plant or another is eased; the distribution engineer can more readily forecast the cost of laying new supplies or doing work for customers by reference to jobs already carried out on which costs can be ascertained.

DISCUSSION

Mr. H. Blythe (Colwyn Bay) emphasised the need for some form of simple budgetary control similar to that practised in former municipally-owned undertakings and felt that present accountancy methods were too involved to be appreciated by the managers of small works.

Mr. C. W. Butler (Rhyl) expressed the view that accountants were not sufficiently human in their dealings with consumers, and were all too prone to regard the consumers as a cipher in the rental ledger. The final judgment of all their efforts was whether or not a cheaper therm could be sold to the consumer.

Mr. H. J. Stanley (Penmaenmawr) enquired whether it would be possible to send one account for all services rendered. He instanced cases where three separate accounts for coke, fittings, and gas were regularly despatched to the same individual.

Mr. J. Woodcock (Colwyn Bay) felt that, while a more involved system of budgetary control was being advocated in certain quarters, the questions arose of what was correct and what was economic. There was a marked reluctance among operatives to spend any time beyond the bare minimum in supplying information required by the accountants.

Mr. O. P. Cronshaw (Rhyl) hoped that the industry would never fall into the error of accountancy for accountancy's sake. Accountancy was, however, one of the main tools of management. Properly carried out and intelligently interpreted it became the foundation upon which to build a prosperous undertaking.

SAFETY FIRST IN THE GAS INDUSTRY

'First Aid and Resuscitation' was the title of a paper by Mr. R. H. Hanford, Distribution Engineer, Port Talbot undertaking, Wales Gas Board, to the Wales and Monmouthshire Junior Gas Association on November 17. In his contribution, which contained many hints on safety measures, the author emphasised the importance of training a proportion of the personnel in first aid, together with experience under live gas conditions.

Every mainlaying gang, and small groups of district men working together, said Mr. Hanford, should be provided with a first-aid box; and he emphasised that if there is no ventilation and a concentration of gas is suspected, no-one should enter an enclosed space without a suitable respirator and a life-line attached to the body. Many fatal accidents have taken place as a result of even experienced men entering a gas atmosphere without a respirator, to attempt to rescue others.

The Antipoys respirator, the author explained, is the normal type in use in the gas industry. The main difficulty, he said, appears to be that when the mask is worn and more than one length of tube is run for fresh air inlet, the wearer is incapable of carrying out heavy manual labour. In these cases a blower of the hand-operated pattern or low pressure air lines in gasworks could be used to provide a constant supply of air under a small pressure. This will ease the breathing of the operator, who should be capable of normal types of work. It is possible, with the above refinements, to have a 100 ft. length of air tube. Under-water rescue could be undertaken using the Antipoys respirator with a blower attachment. This rescue could be attempted in up to 20 ft. depth of water.

It is of extreme importance that, where a respirator is used, a life line should be utilised for the recovery of a person who is overcome in a gas atmosphere.

The nasal-type mask is much easier to work with, but it relies on a sealing medium of air supplied through a side connection. It is impossible to fit various persons correctly with the same mask. Therefore, it should not be used except in conjunction with a blower. During the war, several undertakings had fitted to their Antipoys respirators canisters for the protection of personnel from poisonous gasses other than town gas. It is dangerous practice to continue to use this attachment, as the maximum safety with the canister type is 0.5% concentration for 30 min.

Self-contained respirators are designed to give a predetermined quantity of respirable air to the operator, and are entirely independent of any communication with the outer atmosphere. Sets can be purchased to give an operating period of 20 min. or 2 hours. This type can be used in tanks, chambers, etc., and to enable a person to rescue another, and it is also possible to walk some distance with freedom of action.

Section 27 of the Factory Act, 1937, as amended by Section II of the Factory Act, 1948, requires the provision of breathing apparatus, reviving apparatus, and belts and ropes in certain circumstances where there is a risk of persons being overcome by dangerous fumes.

[Mr. Hanford's paper was also presented to the North Wales Section on November 19 at Penmaenmawr.]

MOBILE LABORATORY FOR SMALL NEW ZEALAND WORKS

WHEN the cost of coal into works was increased by over 100% in 1950, the New Zealand gas industry was forced to increase its charges for gas. To offset this sudden increase in the price of gas to the public, the Government instituted a special fund by setting aside a sum of £600,000 per year for two years, to help the industry meet this big hurdle. From this sum a subsidy of 2s. per 1,000 cu.ft. of gas sold was paid to all gas companies, and the balance was used to provide assistance by way of loan to small works to help put their plant in order.

The industry has long felt the need for providing technical assistance to the smaller works throughout the country. Only the works in the four main cities have staffed laboratories, and the remaining 30 or so may be classed as small works, taken on New Zealand standards. The New Zealand Gas Institute then submitted a report to the Gas Association outlining a scheme for providing a mobile testing service for all the works not possessing a trained technical staff, and urging Government provision for the establishment of such a scheme from the subsidy funds.

The Government agreed to the submission by the Association, and a committee was set up to inaugurate and control the operation of the scheme. Because gasworks are scattered throughout the length and breadth of New Zealand there will be two mobile laboratory units, and it is proposed to build a small base laboratory in Wellington as headquarters of the service to the industry.

The first mobile laboratory started operations in August, and the second unit will be on the road next year. Three chemists will be required to operate the scheme. Two of them will be brought from England.

The service when in complete operation will provide for each works to receive an annual visit of one week's duration from the mobile laboratory equipped with most of the apparatus for general gasworks testing. Samples which require more complete testing than can be performed in the mobile laboratory will be forwarded to the base laboratory in Wellington for examination.

The second unit, which will not be so fully equipped, will make two 'flying' visits to each works in a year, for the purpose of making carbonising efficiency checks and other work not requiring the use of expensive equipment. Thus, each works will receive three visits from the mobile testing service each year, and, as a result, it is hoped that the industry will be kept operating at a maximum efficiency, with benefit not only to itself but to the public.

SMITH METERS DINNER AND DANCE

OVER 300 gathered at Caxton Hall, Westminster, on November 21, for the annual staff dinner and dance of Smith Meters, Ltd. Mr. W. W. Scott, in proposing the toast of the Chairman and Directors, said how fortunate the company was in having directors with first-hand knowledge of the job in hand from the bench to the board room; and how good it was to have men who were young in heart and had unbounded energy.

Mr. R. W. E. Gaskin (right) was the recipient of presentations (made by Mr. S. Porter, Kennington, and Mr. A. Barnes, Streatham), to mark his retirement from the Board of Smith Meters, Ltd. The gifts were an antique fruit bowl and a silver tea set. Next to him is Mrs. Gaskin, and on the left are Mr. Norman L. Smith, Chairman, and Mrs. Smith.

Those who knew the company well would have missed a familiar face—a person whose loyalty to the directors both past and present was placed above everything else. He referred to Mr. Wallington, who for many years had held the office of Secretary; a remarkable man who remained in harness to the end.

The Chairman, Mr. Norman L. Smith, replying, said this was the fifth successive year of the staff dinner, and he and his co-Directors were delighted to have the staff and many friends with them on that annual occasion. He was especially pleased to welcome Colonel Smith, Chairman of United Gas Industries, whom he had known for nearly 30 years from the bench to the board room. Mr. Smith then called on Mr. Porter and Mr. Barnes to make a presentation to his retiring co-director, Mr. Dick Gaskin. He had worked with him for 30 years, and Dick Gaskin had had a very large hand in producing the very fine meters being made today.

Mr. R. W. E. Gaskin, in thanking the staffs of both factories for the presentations, spoke of past members of the firm—Mr. Ernest Smith, Mr. Lewis Smith, and Mr. Arthur Charles—three Directors who had always been esteemed by everybody in the firm, and their old friend Mr. Wallington.

Mr. R. D. Gaskin welcomed the guests, especially the ladies. Dr. W. F. Coxon responded.

A Food 'Flying Squad' of Northwich W.V.S. members who have been specially trained in large-scale emergency methods by the North Western Gas Board home service experts 'graduated' by cooking a two-course luncheon for 50 people in the open air at Northwich on November 24. The squad used an oven made by the class out of bricks, mortar, sheet-iron and drain pipes, to cook the meal, which was then distributed to old people in the district by means of a Ministry of Food mobile canteen. This open-air cookery, staged in the yard of Northwich gasworks, represented the final stage of a full course in emergency methods, to be adopted in wartime for feeding large numbers of people, organised for the W.V.S. by the Board's home service section.

Inauguration of Foleshill Extension

THE extensions at the Foleshill (Coventry) works of the West Midlands Gas Board—the subject of a special descriptive article in the 'JOURNAL' last week (pp. 526-530)—were inaugurated on November 25 by the Lord Mayor of Coventry, Alderman H. B. Cresswell (the first civic head to bear the full title of Lord Mayor). Over 100 people attended the ceremony and saw Alderman Cresswell and Mr. G. le B. Diamond, Chairman of the West Midlands Board, open valves allowing gas to enter the new spiral guided holder. In the new retort house the Lord Mayor unveiled a plaque commemorating the occasion.

Mr. DIAMOND, who extended a special welcome to Mr. P. N. Langford and Mr. J. E. Wakeford, both former Engineers at Coventry, reviewed the history and development of the Coventry undertaking from its inception in 1823. The undertaking was purchased by the corporation in 1884, the present site at Foleshill was acquired in 1898 and the Gas Street works was closed down in 1908, by which time the demand for gas had risen to 800 mill. cu.ft. per annum. The first world war saw an enormous expansion; thereafter, the demand continued to grow between the wars until the peak output of the second world war was reached in 1944, when total sales were 4,213 mill. cu.ft. per annum.

Post-War Recession

With the cessation of the war contracts in the factories and the transition to a peace time economy, the output of gas dropped in the year ended March, 1946, to 3,700 mill. The recession was, in fact, a transitory phase towards a new high level of industrial activity and an immense increase in manufacturing capacity in the city which had an equally drastic effect on the gas undertaking. For example, between 1947 and 1948 the output increased by no less than 30% and although the Corporation, the then owners of the gas undertaking, ordered additional plant to cope with the demand, there was little possibility of contractors being able to erect new plant in the time owing to the shortage of steel, building materials, and the difficulty in obtaining the right kind of labour.

In April, 1947, the Gas Committee was recommended to order a new carburetted water gas plant of 3 mill. cu.ft. per day capacity. The contract was signed on February 1, 1948, but the plant did not commence gasmaking until September, 1950, 17 months after the Board took over. In the meantime, the situation had become so serious that, in October, 1949, the engineers at Foleshill set about making a home made carburetted water gas plant, of about 1 mill. cu.ft. per day capacity, to meet a desperate position.

The new water gas plant had been ordered in April, 1947, but, by September, the Engineer and Manager recommended the Gas Committee to install a new 6 mill. cu.ft. per day vertical retort installation, together with ancillaries, and also to provide an additional 6 mill. cu.ft. gasholder. The contract was signed in December, 1948, but that retort house was not finished yet, for all work on it had to be abandoned with the intervention of a drastic and serious emergency. The high level of demand had restricted the normal repair programme which, inevitably, led to a chain of circumstances detrimental to operational efficiency and bringing into being the law of diminishing returns. From vesting day onwards the Board spent a large sum of money and used every effort to try to overcome the backlog of repairs but it soon became evident that 'B' Section retort house, which the Coventry Corporation had reported to the Ministry of Fuel and Power as due for rebuilding in 1949, was completely worn out and, in addition, the retorts in 'C' Section, after nearly six years of continuous gas production, had, at one time, as many as 20 completely out of action.

In April, 1950, after consultation with West's Gas Improvement, Co., Ltd., and the Ministry of Fuel and Power, it was decided to order an exact replica of a retort house recently installed at Stoke, to avoid the bottleneck of drawing office work. This plant had a capacity of 6¾ mill. cu.ft. per day. The first brick was laid in January, 1951, and they now stood in the house, fully working to capacity, a record of which all concerned could be proud. Every credit must be given to West's Gas Improvement Co., the contractors, and the workmen who carried it out.

The contract for the new gasholder was placed by Coventry Corporation on March 21, 1949. Its construction involved the use of 2,500 tons of steel and its tank, 232 ft. in diameter, held 11 mill. gal. of water. To cope with the work a hostel had to be built for 60 workmen at the extremity of the Foleshill Works site, in order to accommodate the contractors' men for, without it, the work could not have been accomplished owing to the difficulties of securing lodging accommodation.

Mr. Diamond paid a tribute to the Board's staff. Mr. Allen, the Divisional General Manager, Mr. Attwood, the Divisional Engineer, Mr. Green, the Works Engineer and Mr. West, the former Works Engineer, had all put a prodigious endeavour into the reconstruction of Foleshill works.

The Lord Mayor also paid tribute to those who had built up the works in the past and to those who had worked on the construction of the new plant.

WOODEN GAS MAINS

When digging a track into which they were to lay a gas main in Buchan Road, Macduff, workmen came upon wooden pipes, well preserved although they must have been there for about 150 years. Each section consisted of a bored-out log measuring 10 ft. long, with a 9 in. diameter and a 5 in. bore. They were tapered so that they could be fitted into each other to make a continuous pipe. The picture shows two of the sections, illustrating the wide and tapered bores. Those who have seen the pipes are wondering how the bores were made.

Preference for Gas

A NUMBER of town councils in south east Scotland have declined offers of electric cookers for hiring; they prefer to stick to gas. A letter from the South East Scotland Electricity Board to South Queensferry Town Council stated that the Board are prepared to make electric cookers available on hire to the tenants of local authority houses.

The letter stated that the local authority would be required to provide a suitable electric cooker circuit from the meter position to a convenient point in the kitchen, and the Board would provide the cooker control unit, the cooker, and the flexible connection between the two. The cooker would thereby be provided and installed without cost to the tenant. After installation the Board would carry out all necessary maintenance and repairs without charge to the tenants or to the local authority. The tenants, of course, would be liable in cases of gross misuse or malicious damage. The rents for the cookers would be recovered from the tenants by charging either 1,440 (for the three-plate cooker) or 1,200 (for the two-plate cooker) units per annum at 1½d. per unit instead of the normal ¾d.

Bailie McCue said the tenants of the Council's houses seemed to be quite satisfied with the arrangement by which they were supplied with gas cookers from Edinburgh Corporation which they could pay for in a certain period. It was possible that the tenants would not want the electric cookers.

The Council agreed to take no action other than keeping the Board's letter for guidance if any tenant made inquiries regarding an electric cooker.

St. Andrews Town Council had a similar issue before it. It took its decision not to approve the hiring of electric cookers by municipal tenants because of complications in the removal of gas cookers already installed.

'No action' was also decided on by the Town Councils of Galashiels, Peebles, Stirling, and Penicuik. Generally they took the view that it was a matter for the tenants themselves.

Coke Discharger for Verticals

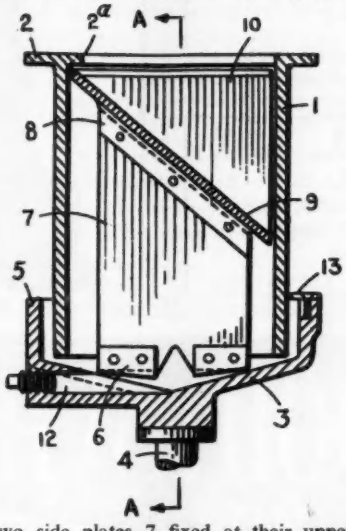
AMONG recent patent specifications published is No. 693,926, which has been granted to F. M. Booth, District Engineer and Manager, Keighley, North Eastern Gas Board. It concerns coke dischargers for vertical retorts, ovens, and other carbonising plant. The aim of the patent lies in simple construction making for ease of assembly, operation, and maintenance.

The coke discharger consists of a stationary bottom discharge box, a vertically movable sealing tray adapted when raised to surround the lower end of this box to form a water seal, and a coke retaining plate with inclined chute adapted to be raised and lowered within the discharge box in unison with the sealing tray. The coke retaining plate is mounted on the sealing tray by readily detachable supports, has an inclined base, and is enclosed on two sides to provide a chute to ensure delivery of coke in one direction only when lowered below the bottom edge of the box.

The accompanying diagram is a vertical section through the centre of a discharger in the closed position.

The discharge box consists of a rectangular-sectioned structure 1 open at top and bottom and suspended by its upper flanged end 2 from the coke cooling chamber. The flange has an interior lip 2a on three sides which shields the space between the box and the retaining plate. A dished sealing tray 3 for containing the sealing water is mounted on a column 4 for raising or lowering. It is of a size and shape with surrounding walls 5 enabling it to surround the lower end of the discharge box when raised to its closed position.

The bottom of the sealing tray has lugs or brackets 6 by which are supported



two side plates 7 fixed at their upper ends to lugs 8 depending from the underside of the coke retaining plate 9. This plate 9 is inclined forwardly and downwardly at (say) 40° and has triangular side walls 10, bevelled at the top, forming a chute of a size just capable of rising and falling within the discharge box. The plate 9 side plates 7, and sealing tray 3 are connected by bolts or other means permitting ready dismantling for replacement of any part.

When in use the tray is filled to the level of the overflow with water, and when raised to its highest position shown in the diagram, the lower edges of the discharge box are sealed in the water and access of air to the retort above or escape of gas is prevented. In this position the retaining plate 9 is wholly within the box and coke descending past the extractor gear at the base of the retort accumulates in the coke cooling chamber and is supported on the plate.

When the accumulated coke is to be discharged, the tray and plate are lowered until the latter is in its lowest position in the box, whereupon the coke is discharged forwardly down the chute. The tray and plate are then raised again to the sealed position.

The water with which the hot coke is sprayed while accumulating in the coke cooling chamber descends into the tray and the excess passes by a pipe from the overflow to a sump from which it is recirculated to the coke cooling chamber.

Any fine coke breeze washed down with the water will accumulate in the tray and a plugged run-off 12 is provided for periodically flushing out this accumulation.

A cast iron or other renewable wearing strip 13 is secured to the top edge of one of the walls 5 of the tray on the coke discharge side to serve the dual purpose of preventing coke from falling into the tray and also from abrading the edge of the tray itself.

Trade News

The 'Wynip'

A self gripping hook has been produced which can be used for a multiplicity of purposes—for supporting pipes, cables, etc., from a vertical girder. The success of the 'Wynip' is in the ingenious mechanical design by which the load

is made to intensify the grip as it increases. The two sockets gripping the girder edge are tapered to give maximum grip and ensure that slip is impossible while the load is applied. The hook is cast in one piece from 'Wycliffe Blackheart' malleable iron and has been officially tested to carry a weight up to one ton. Of simple design, the hook is always ready for immediate use. Fixing is simply a matter of placing the 'Wynip' on the girder face with the sockets round the edges and hammering home. The more weight that is applied to loading hook, the tighter the grip. When the load is removed the hook can be instantly detached by a light blow under the hook. Drilling of girders is avoided and no nuts or bolts are needed.

'Wynips' are supplied in different sizes to fit standard girder sections. They can be supplied with different hook portions to carry air, water, gas, and oil pipes of varying diameter.—*Follsain-Wycliffe Foundries, Ltd., Lutterworth,* near Rugby.

Gas Analysis by I. R. Spectra

The process of gas carburising needs careful control, and it has been found that at least two analytical measurements are necessary—namely, of carbon dioxide concentration and hydrocarbon concentration. The carbon dioxide concentration should be very small; the hydrocarbon concentration is measured before and after hydrocarbon enrichment. The water vapour content in the furnace must also be kept to a very low figure, and in some cases dewpoint is measured.

The Infra Red Development Co., Ltd., has brought out apparatus for such measurements. For the analysis there are two separate gas concentration indicators; the CO_2 instrument measures in the range 0-1% CO_2, and the hydrocarbon instrument measures methane in two ranges alternately, 0-5% in the gas before it is enriched, and 0-30% in the furnace atmosphere in which the added hydrocarbon (usually propane) has been cracked, and so has become mainly methane. The equipment includes sampling apparatus in which the gas to be analysed is reduced to standard density conditions (630 mm. pressure at 0°C.) by automatic means, and the whole functioning is controlled on a time cycle by a synchronous motor mechanism in a four-point recorder (by the Foster Instrument Co., Ltd.).

The cycle of operations is as follows: For one minute, the input gas before carbon enrichment is measured, the recorder registering both the CO_2 and CH_4 value (the latter in the range 0-5%) and the indicators on the two analysers also showing the values. A time switch then changes the input to the gas analysers of the furnace atmosphere, which is collected from a manifold on the side of the furnace, and simultaneously changes the range of the CH_4 instrument to 0-30%. For the next minute, the CO_2 and CH_4 concentration in the furnace gas are recorded on two fresh traces and the values also indicated on the meters of the two gas analysers.

This process goes on continuously unless, by operating a selector switch, other functions are selected. By this selector, the whole equipment may be left on the input gas line, or the furnace gas line, or air may be drawn in to check zero readings, or a standard cylinder of calibrated gas mixture, CO_2, CH_4 and nitrogen, may be connected to the gas analysers, thus checking the scale accuracies.

The equipment incorporates filters, regulators, pumps, and electro-magnetic gas valves. The correct functioning of these is checked by four vacuum gauges and three flow indicators, and the flow is adjusted by one throttling valve. Signal lights plainly show which line is being measured and which range on the methane analyser is in use.—*Infra Red Development Co., Ltd., 11, Broadwater Road, Welwyn Garden City, Herts.*

GAS METER CRANKS

Telephone: DUNSTABLE 90

The Clifford Engineering Co., Ltd.

Dunstable, Beds.

Specialists for over 30 years

Single and double throw cranks for all meters

EWART CHAINBELT CO., LTD.

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Driving and Conveyor Chains of the best quality; made of Ley's Celebrated Blackheart Malleable Iron.

ALSO COMPLETE CONVEYORS AND ELEVATORS

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FOR STEAM, WATER, OIL, GAS AND AIR

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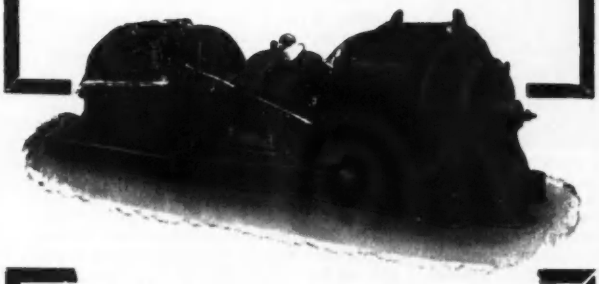

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Considerable vesicant gas resistance under conditions of flexing and frictioning.

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Lighter in weight than corresponding 'drying-oil' oil-skin.

No seasoning.

100% greater resistance to cracking than 'drying-oil' oilskins.

Will not develop tackiness, no hydrolysis after exposure to humidity and heat.

Resists tropical mould growths - does not support insect life.

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GJ/5310/CT1

PUBLISHERS' NOTICE

The " Gas Journal " is published every Wednesday, price 1/3d.; by post 1/5d.

Subscription Rates: Home and Empire:—52/- per annum; Foreign:—60/- per annum. (Both payable in advance.) A copy of the " Gas Journal " Calendar & Directory is presented each year to continuous subscribers.

Classified Advertisements: All small classified advertisements are charged at 1/9 per line (approx. 7 words)—minimum charge 10/6. A Box Number address occupies 2 lines, and a further 6d. is charged towards cost of postage on replies. Copy must be received by first post on Monday to ensure insertion in that week's Journal.

Displayed Advertisements: Rates obtainable on application to the Business Manager. Change of copy for displayed spaces must be received 14 days prior to publication if proofs are required. Type area of inside pages 10" deep × 7" wide; block screen 120.

BUSINESS MANAGER : S. T. CULLEN

MIDLANDS OFFICE: 10, Union Street, Birmingham.

NORTHERN MANAGER: W. Q. Foster, 33, St. Helens Road, Harrogate. *'Phone:* Harrogate 84291.

WALTER KING, LTD., 11, Bolt Court, Fleet Street, London, E.C.4.

Telephone: CENtral 2236-7. *Telegrams:* Gasking, Fleet, London.

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KETTLE DESCALER

For resale to the public, and in bulk for Works use.

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APPOINTMENTS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18–64 inclusive or a woman aged 18–59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.

WEST MIDLANDS GAS BOARD

GASFITTERS

VACANCIES exist for First Class and Second Class GASFITTERS at the Coventry and Redditch Undertakings of the Board.

Applications for Coventry should be addressed to the Divisional General Manager, West Midlands Gas Board, Gas Offices, Gas Street, Coventry, and for Redditch to the Engineer and Manager, Gas Works, Redditch, Worcestershire.

Amendment to Application Date

SCOTTISH GAS BOARD

SOUTH EAST DIVISION

DENNY DISTRICT

APPOINTMENT OF DISTRICT MANAGER

The date by which applications for the above appointment are to be received has been extended from Monday, November 30, 1953 to Monday, December 7, 1953. (See advertisement in the *Gas Journal* of November 25).

SCOTTISH GAS BOARD

GLASGOW DIVISION

GLASGOW DISTRICT

TECHNICAL ASSISTANTS

PROVAN GAS WORKS

APPLICATIONS are invited from suitably qualified persons for the undernoted posts—

1. SENIOR TECHNICAL ASSISTANT (CHEMICAL)

This post is graded within the Scale Provincial 'A' Grade A.P.T. IX (£615-£715) and candidates should be fully experienced in the operation and control of gas production in large scale C.V.R. installations, all ancillary processes, and should be conversant with all routine gasworks tests.

2. SENIOR TECHNICAL ASSISTANT (CHEMICAL)

This post is graded within the Scale Provincial 'A' grade A.P.T. VIII (£585-£665) and candidates should be fully experienced in the operation and control of gas production in large scale C.W.G. installations, all ancillary processes and should be conversant with all routine gasworks tests.

3. TECHNICAL ASSISTANT (CHEMICAL)

This post is graded within the Scale Provincial 'A', grade A.P.T. IV/V (£305-£540) and candidates should be experienced in gas manufacture and ancillary processes and be capable of undertaking routine analytical laboratory work.

Appointments to these posts, which are superannuable, will be in accordance with experience and educational qualifications.

The successful candidates may be required to pass a medical examination.

Applications, stating age, education and experience, along with the names of two referees, should be in the hands of the undersigned not later than Saturday, December 19, 1953.

D. F. YOUNG,
Divisional Controller.

30, John Street,
Glasgow, C.1.

SCOTTISH GAS BOARD

NORTHERN DIVISION—

INVERNESS SUB-GROUP

SUB-GROUP TECHNICAL ASSISTANT

APPLICATIONS are invited for the post of SUB-GROUP TECHNICAL ASSISTANT. Candidates should have experience of the operation and control of carbonising plant and of the works and laboratory tests necessary for maintaining a high degree of efficiency. Possession of the Higher Grade Certificate in Gas Engineering (Manufacture) or similar qualification is desirable.

The post entails periodical visits to the various works in the Sub-Group and offers a good opportunity of gaining a varied experience.

The salary will be Grade A.P.T. VI, Provincial 'A' (£490-£570). The successful candidate will be required to undergo a medical examination and join the Board's Superannuation Scheme.

A small flat is available at reasonable rent.

Applications to be addressed to the undersigned to arrive not later than December 18, 1953.

JOHN FORD,
Sub-Group Manager.

Gas Works,
Manse Place,
Inverness.
November 27, 1953.

DRAUGHTSMAN

(SENIOR)

age over 30, required for large constructional engineering company in the Midlands. Wide gas holder and plate-work experience essential. Good opening for right man. Pension scheme.

Write, in confidence, stating age, experience, qualifications and salary required to: Personnel Manager, Box 397, 19/21, Corporation Street, Birmingham, 2.

EAST MIDLANDS GAS BOARD

SHEFFIELD & ROTHERHAM DIVISION

ENGINEERING DRAUGHTSMEN

APPLICATIONS are invited from suitably qualified persons to fill two vacancies at Divisional Headquarters in Sheffield.

Applicants should have had general experience in a Drawing Office and a knowledge of gas works plant would be an advantage, though not essential.

The salary will be within the range A.P.T. V-VII (£460-£625) of the National Salary Scales for Gas Staffs and the grading will be in accordance with qualifications and experience.

The successful candidates may be required to pass a medical examination and, unless already subject to a pension scheme by virtue of the Gas (Pension Rights) Regulations, 1950, will be required, if eligible, to join the Board's Staff Pension Scheme within six months from taking up the appointment.

Applications with details of age, qualifications and experience, together with the names of two referees, should be addressed to reach the Divisional Personnel Officer at the address below not later than December 12, 1953.

C. C. WOOD,
Divisional General Manager.

Gas Offices,
Commercial Street,
Sheffield, 1.
November 24, 1953.

(*Classified Advertisements continued on page* 622

APPOINTMENTS VACANT (ctd.)

EASTERN GAS BOARD

SUDBURY DISTRICT

FIRST CLASS District Gas Fitter urgently required. Full J.I.C. rates of pay (Provincial 'B') and conditions of service.

The successful candidate will be required to pass a medical examination.

Applications, stating age and giving full details of qualifications and experience should be forwarded without delay and addressed to : The Group Manager, Eastern Gas Board, Ipswich Division, Gas Works, Bury St. Edmunds.

EASTERN GAS BOARD

IPSWICH DIVISION

CHELMSFORD GROUP

TWO First Class District GAS FITTERS required to work in the Maldon and Witham Districts respectively. Full J.I.C. Rates of Pay (Provincial 'B' at present 3s. 5½d. per hour) and Conditions of Service. Local housing accommodation may be available in the near future. The successful applicants may be required to pass a medical examination and to contribute to any pension scheme approved by the Board. Applications, giving age, present duties and references, should be addressed to Mr. F. N. Howes, Group Manager, Gas Works, Chelmsford, within two weeks of the appearance of this advertisement.

GUERNSEY GAS LIGHT COMPANY LTD.

APPLICATIONS are invited for the position of ASSISTANT ENGINEER AND MANAGER to the above Company.

Candidates should have a comprehensive knowledge of gas manufacture and distribution, with some administrative experience.

Applicants should furnish details of training, experience and qualifications and should state the salary required. *Copies* of three Testimonials should be enclosed.

Envelopes to be marked 'Confidential' and addressed to the undersigned, should arrive not later than December 15, 1953.

S. G. VANE,
Engineer & Manager.

16, Smith Street,
Guernsey.

SOUTHERN GAS BOARD

NORTHERN DIVISION

OXFORD AND DISTRICT GAS UNDERTAKING

DISTRICT INSPECTOR

APPLICATIONS are invited for the position of DISTRICT INSPECTOR at a salary within Grade A.P.T. IV, Provincial 'A', of the National Salary Scales (£305-£495 per annum).

Applicants should be experienced in modern gas fitting practice and qualified to advise consumers, prepare estimates and direct the work of fitters.

The person appointed will be required to pass a medical examination and to contribute to the Board's Staff Pension Scheme, subject to the preservation of any existing pension rights in the gas industry.

Applications, giving age, education, qualifications, experience, present position and salary, and the names of two referees should reach the undersigned not later than December 15, 1953.

S. C. BENTLEY,
Engineer and General Manager.

Therm House,
St. Aldates,
Oxford.
November 24, 1953.

W. C. HOLMES & COMPANY LTD. have vacancies on their staff as follows :

1. Chemical Engineers, holding a degree in Chemistry, Gas or Chemical Engineering, preferably with some experience in research work on laboratory or pilot plant scale.
2. An Analytical Chemist, preferably holding a degree in Chemistry, and with some experience in modern methods of chemical analysis.
3. Technical Assistants, having at least two years experience in the testing, control or operation of gasworks or chemical plant. Chemical or gas engineering qualifications an advantage.

Posts 1 and 3 above may involve some travelling, but most of the work will be done at the new Research Laboratories at Cleckheaton.

Candidates should have completed their National Service Training.

Application for the posts should be made to J. J. Priestley, W. C. Holmes & Co., Ltd., Research & Development Department, Whitechapel Road, Cleckheaton, Yorks.

BRISBANE GAS CO., LTD.

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INDUSTRIAL GAS TECHNICAL OFFICER

APPLICATIONS are called for the above position from young men with technical training and qualifications in the use of gas for industrial purposes, capable of advising consumers, preparing details and tenders for appliances required, supervising the installation of equipment and operation when complete.

The position offers to a capable and enthusiastic young man a wide scope for industrial gas sales and the person appointed will be given every encouragement. Preference will be given to applicants who hold A.M.I. G.E. and Institution of Fuel membership. The minimum commencing salary offered is £950 per annum (Australian), payable monthly.

Travelling expenses per tourist class liner will be paid on the basis that the appointee remains in the Company's service for three years. Salary to commence from date of embarkation.

Applications, stating age, marital state, training and experience, qualifications, *copies* of references, and when available, to be addressed to the undersigned who will supply further information regarding local conditions on request. Closing date December 31, 1953.

MESSRS. WM. COWARD & CO., LTD.,
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THE East Midlands Gas Board, Sheffield and Rotherham Division, have for disposal a STEAM LOCOMOTIVE by Peckett & Sons. This Locomotive is of standard gauge, two cylinder, 12 in. bore, 20 in. stroke, wheelbase 5 ft. 3 in., working pressure 160 p.s.i., copper tubes and firebox. A new saddle tank was fitted in September 1952, and new tyres in March, 1950. It is lying at Grimesthorpe Gas Works, Sheffield, and can be inspected any time by appointment with the Divisional Engineer, at the address below. Tenders should be submitted to the Divisional General Manager, also at the address below, not later than December 14, 1953, and should be in sealed envelopes bearing the endorsement "Tender for purchase of Steam Locomotive."

CHAS. C. WOOD,
Divisional General Manager.

Gas Offices,
Commercial Street,
Sheffield, 1.
November 19, 1953.

PATENTS

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THESE DAYS, a sound investment is something to write home about. What we write of here is not a new discovery, for it has long been at the disposal of industry. The point is that only the alert are using it to their full advantage. We refer to the help afforded to administration by a FULL PHOTOGRAPHIC RECORD of constructional jobs from foundation to completed building, from rough casting to finished product. Nothing escapes the eye of the camera. No other recorder covers such a wide field. A progressive file of photographs taken at regular, specified intervals, is an ever-present aid to the busy executive. It can be referred to at once in case of any point which may arise during the construction of plant or the making of a product. It shows progress at a glance unmistakably and eliminates the cause of wrangling and argument.

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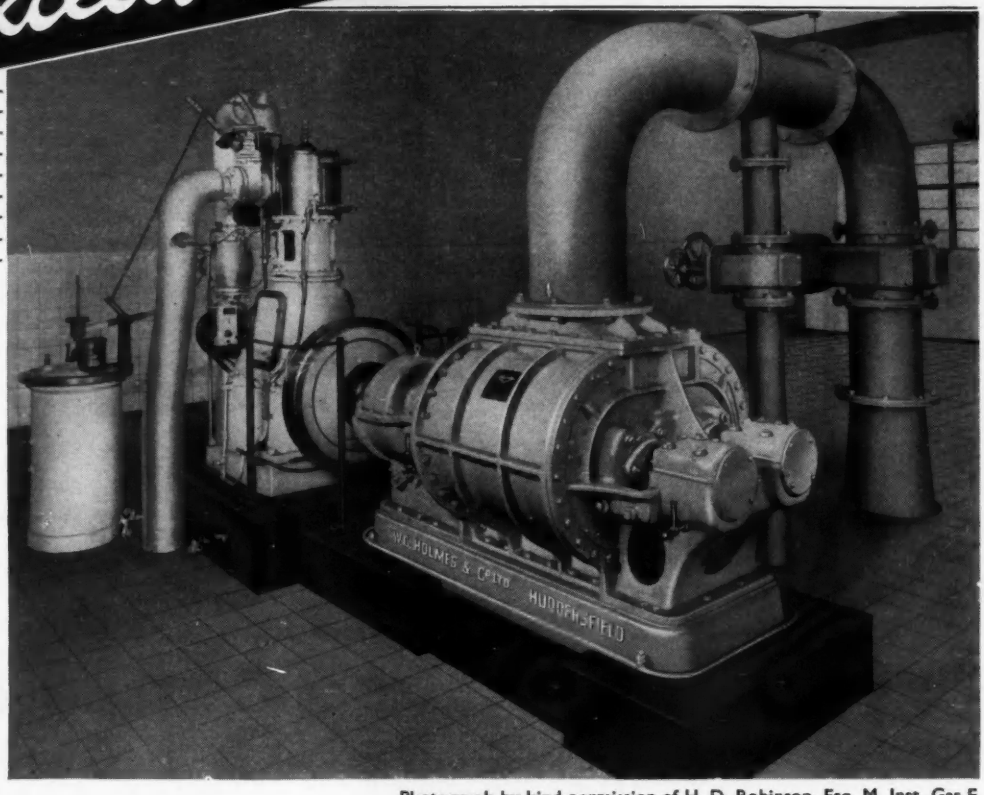

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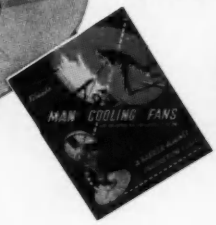
If your concern is for workers in iron and steel works, foundries, boiler houses, gas retort houses, glass works or "lighter" industries where efficiency is bound up with the maintenance of comfortable working conditions then you should see Publication No. 9/7.

A copy is waiting for you.



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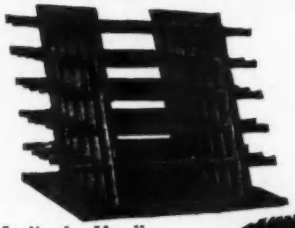

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Embody the latest improvements — are of the very best quality — and are in use extensively throughout the Kingdom

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REPRESENTATIVE: Mr. W. E. Settle, 66, Bridgewater Road, Bradford, Yorks.

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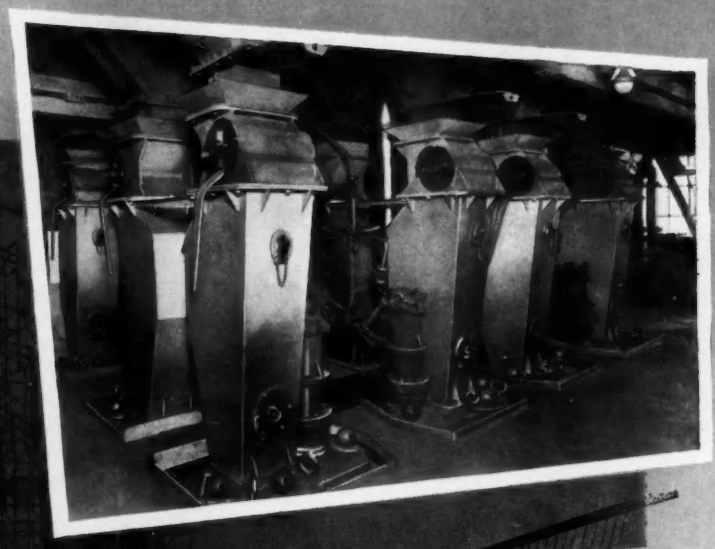
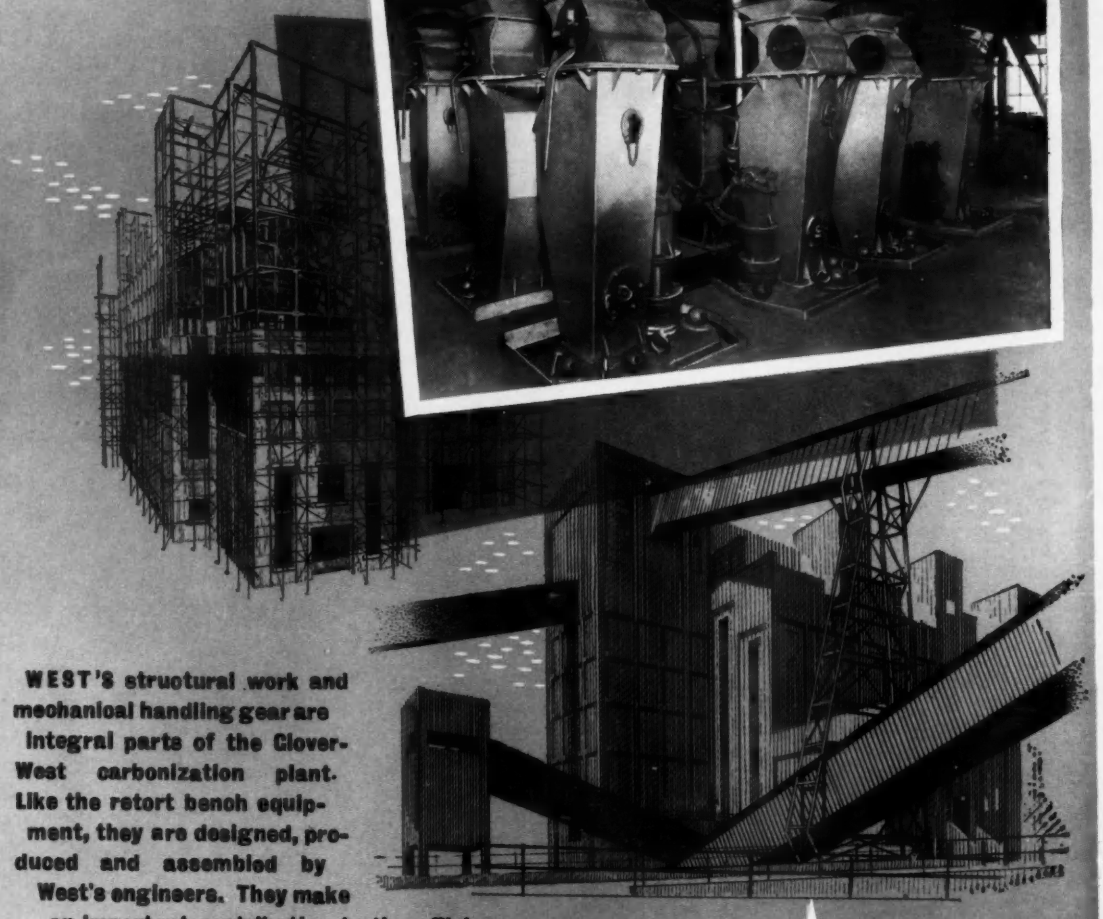
Behind the Retorts





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